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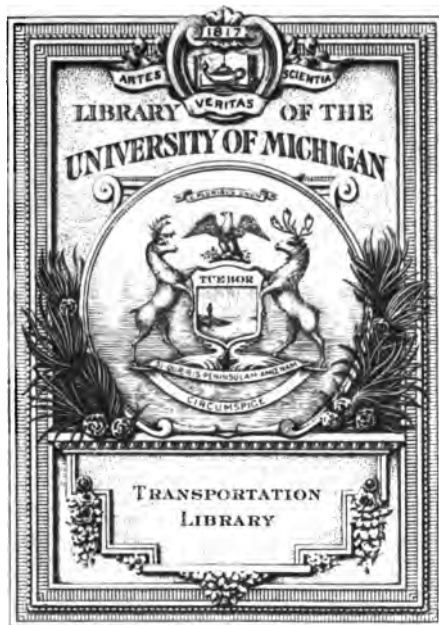
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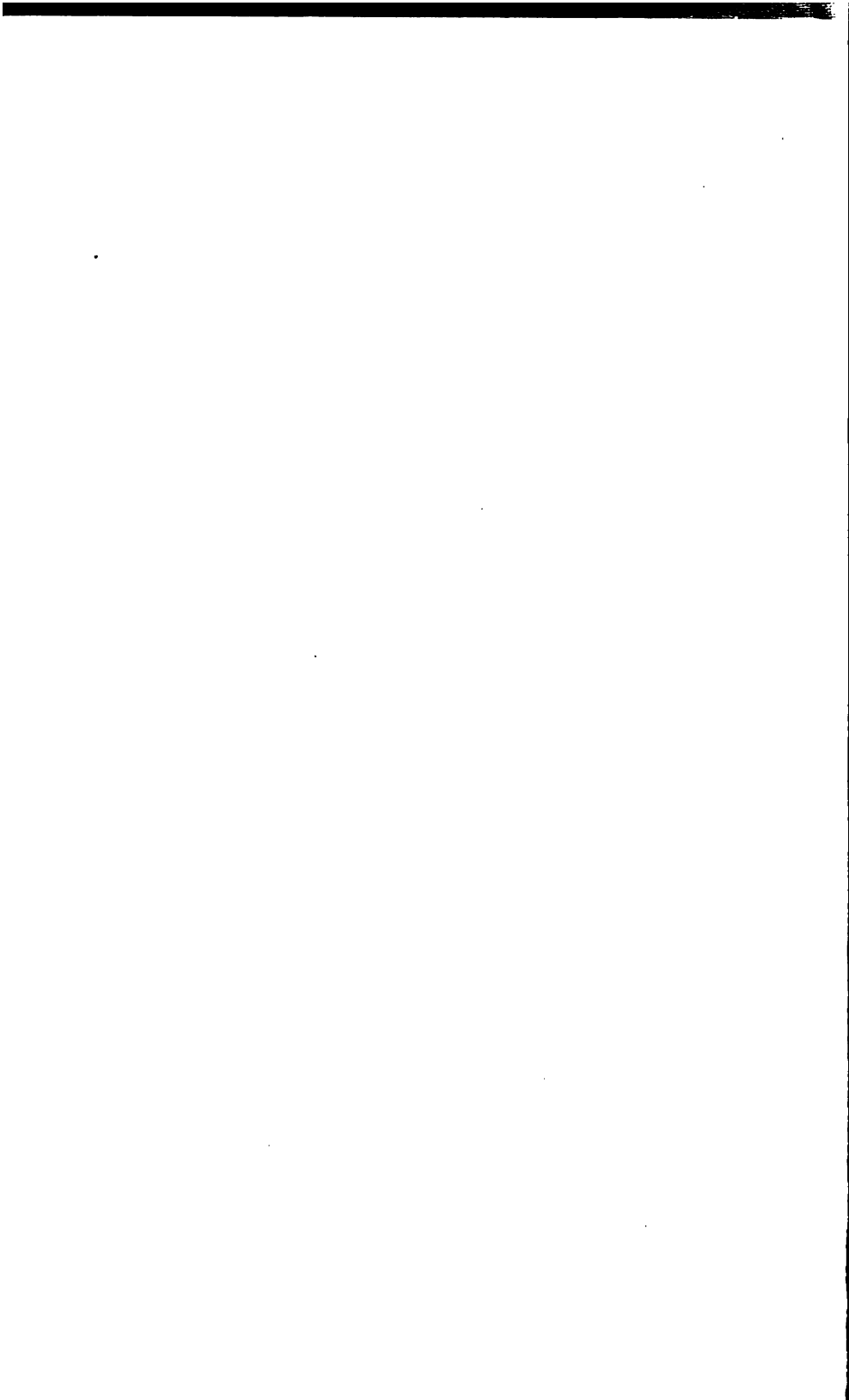
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RAILWAY STATISTICS

OF THE

UNITED STATES OF AMERICA

FOR THE

YEARS 1904 AND 1905

COMPARED WITH LATE STATISTICS OF FOREIGN RAILWAYS

PREPARED FOR THE

GENERAL MANAGERS' ASSOCIATION OF CHICAGO

BY SLASON THOMPSON
BUREAU OF RAILWAY NEWS

CHICAGO:
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Transport.

INTRODUCTORY.

From the organization of the Interstate Commerce Commission in 1887 to the last summary issued by that body, its statistics of American railways appear to have been compiled to bolster up the theories of the Commission's statistician, or to further the propaganda of its able and energetic secretary. To be of the highest value it will be admitted that the government statistics of such a comprehensive industrial system as the railways of the United States should be "as cold as ice" in the statement of facts, and "as pure as snow" from the imputation of being colored by any personal or ulterior purpose. They should seek to mirror as promptly and impartially as possible the condition existing during the period to which they relate.

In the First Annual Report on the Statistics of Railways in the United States for the year ending June 30, 1888, by Prof. Henry C. Adams, (then, as now, Statistician to the Commission,) it was well said that—

"Railway statistics are essential for a proper appreciation of many problems of public economy, for sound conclusions on technical and scientific questions connected with railway management, as well as for the satisfactory performance by the Commission of the peculiar duties which Congress has assigned to it." To this end "the framers of the 'Act to Regulate Commerce' intended to provide for comprehensive and authoritative railway statistics."

Since then under the fostering care of Mr. Adams, aided by liberal appropriations, these statistics have been compiled with ever increasing comprehensiveness, until now they are regarded as the most complete in the world. Unfortunately this development has been attended with increasing dilatoriness in their publication—so that, at this time when they are "so essential for a proper appreciation of many problems of public economy, etc.," the completed statistics for the year ending June 30, 1904, were not distributed until December, 1905.

True, in its Nineteenth Annual Report, presented to Congress December 14, the Commission devoted *a page and a half* to the "Preliminary Report on the Income and Expenditures of Railways for the year ending June 30, 1905;" and in August, 1905, the Commission issued "For the Press" a skeleton of its final report for 1904.

None of these preliminary reports, abstracts or summaries has afforded a comprehensive, authoritative and above all, timely review of railway statistics. It was to remedy, as far as possible, the failure of the official statistician in the last mentioned respect, to make prompt publication of statistics within his possession, that the collection of the statistics behind the summaries herein for 1905 was undertaken.

In securing the data contained in the following pages returns were only sought from roads of 100 miles and over. Under this limitation, adopted for the sake of dispatch, reports were received from operating roads with a combined mileage of 193,404 miles of single track.

The inquiry was purposely confined to the more essential topics on which the Interstate Commerce Commission seeks information, and, so far as it goes, this information is identical with what the Commission obtains from the same sources and which will not be available for intelligent independent study in the official statistics until a year hence—unless the Commission is spurred into more rapid action. That there is no excuse for the delay of a year and a half in making public the statistics of American railways, these pages testify.

Although the total official mileage reported to the Commission in 1904, was 213,904 miles, the total for which "satisfactory operating reports" were received was only 212,243 miles. It is with the assignments and computations, based on these latter figures, that all comparisons in the following pages will be made.

For the sake of brevity the Interstate Commerce Commission will be referred to herein as the "Commission;" the Commission's "Statistics of Railways in the United States" as "Official Statistics;" and "the year ending June 30," will be implied before the figures of the year specified, unless otherwise stated.

The principal conclusions to be drawn from these incomplete prompt returns for 1905, are:

That there is no excuse for the Commission's delay of fifteen months in giving the complete statistics of railways to the public.

That the statistics should be confined to operating companies only, thus avoiding duplications and confusion.

That the compilation of railway statistics should be entrusted to the Department of Commerce and Labor, whose Statistician, O. R. Austin, gets out fuller statistics of American industries every month within a month of the affairs to which they relate than the Commission's statistician furnishes eighteen months after the close of each fiscal year.

That official compilation of statistics should not be entrusted to men with pet theories and prejudices, especially when these are adverse to the interest about which it is essential the truth should be known.

That Congress should establish national inquiry by expert officials into the causes of railway accidents patterned after that in Great Britain.

MILEAGE.

The aggregate railway mileage in the United States on June 30, 1904, was 213,904 miles, of which 212,243 miles were covered in the official reports being 99.22 per cent of the aggregate mileage of the country. This is what is known in railway statistics as single track mileage—that is to say, it excludes second track, third track, fourth track and yard track and sidings.

The single track mileage covered in the following pages, *for the year ending June 30, 1905*, aggregates 193,404 miles, or 91.12 per cent of the officially reported mileage of the preceding year. This mileage classified by states and territories as compared with that given by the Commission's Statistician was as follows:

SUMMARY OF RAILWAY MILEAGE BY STATES AND TERRITORIES.

State or Territory	1905 (91.12% operated)	1904 (99.22% owned)
Alabama	4,439	4,627.60
Arkansas	3,128	4,051.94
California	5,414	6,255.79
Colorado	4,849	4,959.64
Connecticut	940	1,017.72
Delaware	333	301.93
Florida	2,524	3,534.84
Georgia	5,284	6,197.72
Idaho	1,171	1,461.53
Illinois	11,902	11,609.14
Indiana	6,486	6,910.94
Iowa	9,401	9,854.70
Kansas	8,722	8,811.43
Kentucky	2,733	3,242.50
Louisiana	2,430	3,806.11
Maine	1,365	1,964.12
Maryland	1,040	1,371.43
Massachusetts	2,069	2,118.75
Michigan	7,239	8,582.99

Minnesota	7,460	7,741.04
Mississippi	2,877	3,456.25
Missouri	8,028	7,707.05
Montana	3,131	3,260.10
Nebraska	5,845	5,820.88
Nevada	665	986.56
New Hampshire	1,158	1,275.97
New Jersey	2,117	2,259.85
New York	7,417	8,297.29
North Carolina	3,346	3,956.90
North Dakota	3,206	3,190.77
Ohio	8,179	9,128.18
Oregon	1,575	1,736.84
Pennsylvania	9,145	10,933.86
Rhode Island	190	211.89
South Carolina	2,688	3,143.28
South Dakota	2,999	3,047.14
Tennessee	3,217	3,480.83
Texas	10,798	11,823.03
Utah	1,648	1,761.69
Vermont	836	1,063.25
Virginia	3,319	3,828.28
Washington	2,969	3,298.19
West Virginia	2,457	2,765.93
Wisconsin	6,300	7,043.76
Wyoming	1,197	1,247.70
Arizona	1,363	1,751.35
District of Columbia	33	31.20
Indian Territory	2,424	2,532.00
New Mexico	1,986	2,504.66
Oklahoma	2,511	2,611.03
Canada	851	.....
Total	193,404	212,577.57

There is a variation of 334 miles in the above total for 1904 as compared with the 212,243 miles for which operating reports were made to the Commission that year. The latter figure includes 6,638 miles of line on which trackage rights were exercised, as compared with 6,390 miles similarly operated included in the returns for 1905.

It will be observed that in five states, viz.: Delaware, Illinois, Missouri, Nebraska and North Dakota the incomplete mileage reported for 1905 exceeds the complete mileage reported to the Commission in 1904. In several other states the variation is only a few miles.

The representative character of the returns here summarized is further emphasized in the following statement, showing the length of Single Track, Second Track, Third Track, Fourth Track, and Yard Track and Sidings covered by the returns for 1905 in comparison with the Commission's figures for the same items in 1903 and 1904:

	1905	1904	1903
Single Track	193,404	212,243.20	205,313.54
Second Track	16,357	15,824.04	14,681.03
Third Track	1,577	1,467.14	1,303.53
Fourth Track	1,146	1,046.50	963.36
Yard Track and Sidings . . .	64,587	66,492.46	61,560.06
Total mileage (all tracks).	277,071	297,073.34	283,821.52

Attention is directed to the fact that the partial returns for 1905, while representing only 91.12% of the single track mileage of the United States in 1904, show an increase of 533 miles of Second Track, 110 of Third track and 100 miles of Fourth track; while the returns of total mileage (all tracks) to this bureau cover over 93.26% of all the trackage in the country. This means, in the language of the official statistician, "that the new construction for the purpose of developing the facilities of established lines to handle increased traffic is relatively greater than the new construction for the establishment of new lines."

It is apparent from the above table that the total mileage of all tracks operated in the United States in 1905 aggregated over 300,000 miles. It is this trackage and not the single track mileage which is the true measure of the efforts of the carriers to meet the ever increasing demand of American industrial and social advancement.

According to the *Railroad Gazette*, 4,388 miles of new line were built in the calendar year, 1905; more than one-quarter of the amount being credited to three states, North Dakota, 520 miles; Texas, 338, and Illinois, 249.

RAILWAY MILEAGE OF EUROPE.

In order to get a just perspective of the extent of American railways the following statement of the railway mileage of Europe may be studied to advantage:

Country		Miles
United Kingdom	1904	
England and Wales		15,626
Scotland		3,712
Ireland		3,296
Russia in Europe	1903	22,634
German Empire	"	31,064
France	"	32,797
Austria	"	28,228
Hungary	"	12,586
Italy	"	10,998
Spain	1900	10,016
Sweden	1903	8,206
Norway	"	7,631
Belgium	"	1,431
Holland	"	2,848
Switzerland	"	2,051
Denmark	"	2,534
Portugal	"	1,911
Bulgaria	"	1,367
Servia	"	921
Roumania	"	369
Turkey in Europe	"	1,925
Greece	"	2,035
		700
Total, all Europe		182,252

The total trackage of the railways of the United Kingdom on December 31, 1904, was officially reported "approximately" as follows:

	Miles.
Single Track	22,601
Second Track	12,692
Third Track	1,271
Fourth Track	1,030
Fifth Track	153
Sixth Track	85
Seventh Track	35
Eighth to Thirteenth	34
Sidings	13,733
Total Trackage	51,634

EQUIPMENT

This bureau did not attempt to get returns of equipment in 1905. For 1903 and 1904 the official returns were:

LOCOMOTIVES.

	1903	1904
Passenger	10,570	11,252
Freight	25,444	27,029
Switching	7,058	7,610
Unclassified	799	852
Total in service	43,871	46,743
Increase		2,872

CARS.

	1903	1904
Passenger	38,140	39,752
Freight service	1,653,782	1,692,194
Company's service	61,467	66,615
Total in service	1,753,389	1,798,561
Increase		45,172

The increase in the power of the locomotives and the capacity of the cars was much greater than the increase in their number shows. In 1903 the statistician estimated the aggregate tractive power of the locomotives in service at 950,000,000 pounds. A like estimate for 1904 would give an aggregate tractive power of 1,068,000,000 pounds, an increase of 12 per cent in power against 6.6 per cent in number.

Similarly there was an increase of 4.6 per cent in the capacity of freight cars against only 2.3 per cent in their number. The increase in capacity was estimated at 1 ton per car. The total capacity of all classes of freight cars in 1905 can be safely estimated at 53,000,000 tons giving an average capacity per car of slightly over 30 tons.

In addition to these the Commission in 1905 reports that, "From the best obtainable information available there are also 111,122 private cars in the United States, practically all of which are equipped with air brakes."

SAFETY APPLIANCES.

Exclusive of the private cars just mentioned, the report for 1904 showed the following vehicles equipped with train brakes and automatic couplers:

	Total Equipment.	Equipped with Train Brakes	Equipped with Automatic Couplers.
Locomotives	46,743	46,146	46,175
Cars, Passenger	39,752	39,455	39,150
Freight Service	1,692,194	1,434,386	1,674,427
Company's Service	66,615	34,785	63,278
Totals	1,845,304	1,554,772	1,823,030

It is thus seen that practically all locomotives and passenger cars are equipped with safety appliances, while over 84 per cent of the cars in the freight service is equipped with train brakes and almost 99 per cent of them is equipped with automatic couplers.

THE BLOCK SYSTEM.

According to returns gathered by the *Railroad Gazette* on January 1, 1905, the number of miles of road (not miles of track) protected, more or less, by the use of the block system was as follows:

	Miles of Road
AUTOMATIC.	
Single Track	1,333.3
Double Track	3,420.2
Four Track	362.8
Total Automatic	5,116.3
MANUAL.	
Single Track	31,864.5
Double Track	6,928.7
Four Track	767.3
Total Manual	39,560.5
Total Automatic and Manual	44,676.8

Deduct three track lines and lines entered twice	102.1	
Total on which block signals are used	44,574.7	
Deduct mileage where signals only partially used—as in times of fog or for passenger trains	11,756.6	
Total more or less completely protected by Automatic signals	5,026.2	
Manual signals	27,791.9	32,818.1

NEW EQUIPMENT.

According to the same authority (December 22, 1905), there were 165,455 freight cars and 2,551 passenger cars built in the United States and Canada during the calendar year 1905. Of the total of 168,006, only 5,305 were for export.

During the same period the output of locomotives was 5,491 against 3,441 in 1904.

These figures do not include cars and locomotives built by the railways in their own shops. This new equipment is estimated to have cost the railways upwards of \$260,186,000 in a single year.

In the seven calendar years, 1899 to 1905 inclusive, the *Railroad Gazette* estimates that the following new equipment was built outside the railway companies' shops:

Passenger cars	13,646
Freight cars	934,722
Locomotives	27,164

At a conservative estimate cost of \$800 per freight car, \$6,000 per passenger car, and \$12,000 per locomotive, this equipment cost the railways of the United States and Canada \$1,045,621,600.

EQUIPMENT OF BRITISH RAILWAYS.

According to the official returns to the British Board of Trade for the year ending December 31, 1904, the equipment of the railways of the United Kingdom consisted of the following:

	Number
Locomotives	22,195
Passenger cars	49,702
Other cars in passenger trains	19,692
Wagons of all kinds used in conveyance of freight	716,590
Other wagons	19,980
Total number	828,159

To appreciate the contrast between this equipment and that of American railways it should be remembered that British "wagons" average "well below 10 tons" (see *British Railways*, by Hugh Munro Ross, 1904), and their engines are light in proportion.

CAPITALIZATION.

According to the official report for 1904 the par value of the securities of the Railways of the United States consisting of common and preferred stock and funded debt classified as bonds, miscellaneous obligations, income bonds and equipment trust obligations amounted to \$13,213,124,679 or \$64,265 per mile, distributed as follows:

STOCKS.

Common	\$ 5,050,529,469	
Preferred	1,289,369,860	
		\$ 6,339,899,329

FUNDED DEBT.

Bonds	5,746,898,983	
Miscellaneous obligations.....	723,114,986	
Income bonds	229,876,687	
Equipment trust obligations..	173,334,694	
		6,873,225,350
Total stock, bonds, etc		\$13,213,124,679
Capital per mile		64,265

This capital per mile is obtained by dividing the total capitalization by 205,605 the net mileage after deducting 6,638 miles operated under trackage rights from the total mileage of 212,243.

Of the aggregate capital the railways in 1904 in their own corporate capacity owned \$1,942,858,359 in stocks and \$558,472,242 in bonds, making a total of \$2,501,330,601, and leaving \$10,711,794,278 as the *net capital* not owned by railway corporations.

In 1904 only \$3,643,427,319 or 57.47 per cent of the outstanding stock paid a dividend. The amount paid in dividends during the year was \$221,941,049 which was equivalent to 6.09 per cent on stock paying any dividend; but, as the statistician admits, "the average dividend rate would be 3.50 per cent, if the amount paid in dividends were computed on all outstanding stock."

As a statistician should not be permitted to include all outstanding stock in order to feed the agitation against over-capitalization, neither should he be allowed to exclude all non-dividend paying stock in order to exaggerate the rate of dividends. Nor to do the latter should he include dividends which are duplicated through the process of railway ownership of railway stocks.

If the \$38,186,813, which according to his figures are duplicated in the \$221,941,049 paid in dividends during 1904, be deducted, the net dividends \$183,754,236 would average a rate of only 5.04 per cent on dividend paying stock; and only 2.89 per cent on all outstanding stock, instead of 6.09 and 3.50 per cent, respectively, as stated by the official statistician.

COMMERCIAL VALUE OF RAILWAY PROPERTY.

In this connection the Commercial Valuation of Railway Property as found by Prof. Henry C. Adams for the Census Bureau (bulletin 21) becomes of interest. Acting in his dual capacity of statistician to the Interstate Commerce Commission and expert for the Census Bureau, Mr. Adams finds that:

"The commercial value of railway operating property in the United States, computed for the year 1904, was \$11,244,852,000."

This value was obtained by capitalizing the net earnings of the railways by a mean rate of 4.256. As neither the net earnings nor the rate is anything but an approximation, the valuation is doubly so. Net earnings depend so much on what is included under operating expenses that the margin for error runs into the hundreds of millions. The fluctuations in the value of money are so great that the selection of a "mean rate" is wholly arbitrary and a variation a quarter of a point in the mean rate up or down would make a difference of over a billion in the result.

The market price of railway securities is the best practical measure of their value, and this is affected by many influences besides their net earnings and the current rate of money. Estimates based on algebraic formulae which give to the railways of South Dakota a valuation of only \$16,300 per mile and to those of Wyoming \$80,400 are hardly entitled to the government imprimatur or to be cited as "authoritative" as they are by the Commission in its preliminary report for 1905 and (albeit his own) by Statistician Adams in his statistics for 1904.

RAILWAY CAPITALIZATION IN 1905.

The total capitalization of the 201 railways reporting to this bureau in 1905, obtained from an independent source, aggregated \$10,307,142,365 divided as follows:

CAPITALIZATION.

Stocks	\$ 4,979,288,017
Bonds	5,327,854,348
Total	\$10,307,142,365
Per mile of road	53,293
Per mile ^{of equipment} of trackage rights	55,114
Per mile all tracks	37,200

Beyond this capitalization, however, is that of the roads whose lines were operated under lease amounting to 20,208 miles. At the average official capitalization of \$64,265 per mile in 1904, this would increase the aggregate by \$1,298,667,120, making the total for the 201 roads whose operations were reported to this bureau \$11,605,809,485 or \$62,058, after excluding mileage operated under trackage rights.

There is absolutely no means of even approximating the cost of construction and equipment represented in this capitalization. In his general balance sheet for 1904 the official statistician estimates the cost of construction of 198,841 miles of line at \$10,784,449,493 and of equipment at \$727,087,638. As the cost of equipment in locomotives and cars alone sold to the railways during the past seven years has been in the neighborhood of \$1,000,000,000 (vide New Equipment above) the inadequacy of Mr. Adams' estimate is apparent.

Railways are not always able to differentiate between what are repairs, renewals and improvements so as to distinguish between mere up-keep and initial expenditure. In England and European countries they cut this knot by charging practically all new material and equipment, whether it is mere substitution or renewal, to capital account with the following result:

CAPITALIZATION OF FOREIGN RAILWAYS.

		Cost or Capitalization	Per Mile
United Kingdom	1904	\$6,242,473,405	\$280,215
Germany	1903	3,456,790,000	105,400
France	1903	3,455,000,000	142,256
Russia in Europe	1903	2,574,699,000	83,511
Austria	1903	1,397,467,460	111,032
Hungary	1903	713,336,965	64,860
Belgium	1902	419,410,490	167,898
Holland	1902	145,885,000	137,103
Switzerland	1903	270,527,785	106,759
Norway	1903	56,990,000	39,439
Sweden (a)	1903	216,290,000	30,044
Denmark (state)	1903	48,240,000	43,381
Total (149,987) miles . . .		\$18,997,100,105	126,658

Note (a) The state railways of Sweden cost \$44,048 per mile, the private companies only \$22,400 per mile.

Broadly speaking the inferior railway system of Europe cost or is capitalized at twice as much per mile as American railways as a whole.

DISTRIBUTION OF RAILWAY STOCK.

According to a report made to the Senate by the Commission, February 24, 1905, the number of stockholders of record at the date of the last election of directors prior to June 30, 1904, of roads reporting to the Commission was 327,851.

The statement accompanying this report, on which it was based, enumerated only 1182 of the 2104 roads that reported to the Commission in 1904, and very inadequately represented the distribution of stock in the hands of trustees.

The distribution of railway bonds is not ascertainable, but probably it is wider than that of railway stocks.

PUBLIC SERVICE OF RAILWAYS.

How the railways are performing their great duty of furnishing transportation to the passenger and freight traffic of the United States is shown in the briefest possible form in the following table:

	1905	1904
Miles of line represented	193,404	212,243
Passengers carried	681,730,131	715,419,682
Passengers carried 1 mile . . .	22,830,147,000	21,923,213,536
Passenger revenue \$	447,648,444	\$ 444,326,991
Average journey per passenger (miles)	33.44	30.64
Average receipts per passenger per mile (cents)	1.961	2.006
Mileage of revenue passenger trains	431,972,138	440,464,866
Average number of passengers on train	50	46

FREIGHT.

Number of tons carried	1,217,393,271	1,309,899,165
Tons carried 1 mile	180,784,804,000	174,522,089,577
Freight revenue \$	1,367,137,839	\$ 1,379,002,693
Average haul per ton (miles)	147.51	133.23
Average receipts per ton per mile (mills)	7.57	7.80
Mileage of freight trains	518,805,586	535,090,971
Average number of tons in train	332.03	307.76
Mileage of mixed trains	25,701,502	31,973,615
Total revenue train mileage . .	976,479,226	1,007,529,452

In regard to this summary so far as it relates to passenger traffic the most noteworthy feature is the remarkable increase in the number of passengers carried one mile, which according to the official statistician, is "the truer basis for the measurement

of this traffic." While the number of passengers carried shows only a normal relative increase over the complete returns for 1904 the per mile passenger traffic for 193,404 miles in 1905 is absolutely 906,933,464 greater than the final figures for 212,243 miles in 1904. The cause for this remarkable increase is to be found in the heavy travel to the World's Fair in the fall of 1904 and to the Clark and Lewis Exposition at Portland in the early summer of 1905.

The effect of this heavy passenger traffic is reflected in the decrease in the receipts per passenger mile to 1.961 cents. It is not safe, however, to make any deductions from this rate, for it is liable to be considerably changed by the complete returns.

The revelations of the summary as to the freight traffic of 1905 in comparison with that for 1904 are noteworthy. While the partial returns for 1905 indicate a total for all the roads of approximately 1,334,000,000 tons carried or 25,000,000 increase over 1904, the returns for the 201 roads reporting to this bureau give an absolute increase of 6,262,714,423 ton miles.

The average rate at which this enormous tonnage was carried was almost a quarter of a mill below the rate of 1904 and is only $\frac{1}{3}$ of a mill per ton mile above "The lowest point reached by this unit in 1899, when the rate per ton per mile fell to 0.724 cents" as stated by the official statistician.

How the economic results reflected in these average receipts per passenger and ton mile have been made possible are partly explained in the figures as to train mileage and the number of passengers and tons per train. The apparent increase in tons per train from 307.76 to 332.03 is somewhat excessive, because the returns for 1905 cover all the great freight carrying systems of the country. But an examination of the reports of the individual roads indicates that it fairly represents the growth of the train load during the past year. Some roads report an average train load of over 500 tons.

PUBLIC SERVICE OF EUROPEAN RAILWAYS.

The following tables set forth in brief the salient features of the public service and revenues of European railways :

	Passengers Carried (Number)	Freight Carried (Tons)
United Kingdom1904(a)	1,583,170,000	449,900,000
Germany1903	949,290,000	390,741,000
France1903	426,436,850	129,305,435
Russia in Europe1902	111,149,000	151,876,000
Austria1903	176,466,468	121,491,209
Hungary1903	72,423,000	46,424,000
Italy1902	64,898,078	21,987,033
Spain1898	27,000,000	no data
Belgium1903	148,919,072	59,899,136
Holland1903	37,367,000	13,064,000
Sweden1902	33,150,964	22,335,650
Norway1904	9,903,006	3,578,678
Denmark1903-4	24,537,732	3,937,780
Switzerland1903	68,903,548	12,265,111
Total	3,733,614,718	1,426,805,032

Note (a). Includes 384,396,000 season ticket journeys.

The revenue derived from the above traffic was as follows:

	Passenger Receipts	Freight Receipts
United Kingdom \$	200,330,000	\$ 277,000,260
Germany	153,321,500	350,014,500
France	133,661,625	182,026,093
Russia in Europe	51,942,500	211,893,500
Austria	33,608,731	95,672,760
Hungary	15,190,000	41,864,000
Italy	25,746,822	37,829,630
Spain	no separate data on traffic	
Belgium	16,057,500	33,274,660
Holland	9,303,600	8,986,400
Sweden	8,580,060	15,835,230
Norway	1,920,240	2,361,620
Denmark	3,966,030	4,151,790
Switzerland	13,030,194	16,464,996
Total \$	666,658,802	\$ 1,277,375,439

As the mean haul per passenger and per mile is now obtainable for the more important countries in the above table and has been approximated after careful calculations by the London *Statist* for Great Britain at 7.8 and 24.86 miles respectively, the per mile statistics for such countries may be given approximately as follows:

	Passengers carried 1 mile (000 omitted)	Revenue per passenger per mile (cents)	Tons carried 1 mile (000 omitted)	Revenue per ton per mile (cents)
Great Britain	12,347,000	1.54	11,184,000	2.47
Germany	13,821,000	1.11	24,223,400	1.44
France	8,272,000	1.61	10,482,300	1.73
Russia in Europe . . .	6,881,238	.77	21,262,640	.99
Austria	3,156,388	1.06	7,896,910	1.21
Hungary	1,376,037	1.10	3,296,800	1.28
Belgium	2,084,866	.77	no information	
Holland	656,449	1.42	753,792	1.19
Sweden	546,975	1.56	915,735	1.73
Norway	148,545	1.29	139,899	1.69
Total	49,290,498		80,155,476	

With the exception of Great Britain, Austria and Hungary these figures are calculated from the "mean journey per passenger" and "mean haul per ton" as given in the last issue of the British blue book entitled, "Statistical Abstract for the Principal and Other Foreign Countries," and are arrived at by reversing the process by which the average journey and haul is calculated by the official statistician in this country.

The table proves among other incidental things that passenger rates are considerably higher per mile here than in Europe—a condition resulting from the fact that we have 25.9 miles of railway per 10,000 of population, while Europe has only 4.5 miles, or not one-fifth the mileage per capita.

European freight rates average almost double American, although our freight is handled with greater speed and certainty.

EARNINGS AND EXPENSES.

In natural order follows a condensed income account showing the earnings and expenses of the railways of the United States in carrying on the public service above set forth.

INCOME ACCOUNT OF 91.12 PER CENT OF THE RAILWAYS OF THE UNITED STATES FOR 1905 COMPARED WITH THE FINAL FIGURES FOR 1904.

	1905	1904
Mileage	193,404	212,243
Gross Earnings from operation \$	1,962,797,637	\$ 1,975,174,091
Income from other sources . . .	108,530,223	(a) 49,380,970
Gross earnings and income . . . \$	2,071,327,860	\$ 2,024,555,061
Operating expenses	1,261,164,397	1,338,896,253
Salaries and Maintenance of leased lines		453,341
Total \$	1,261,164,397	\$ 1,339,349,594
Net earnings and income	810,163,463	685,205,467
Interest on funded debt	234,240,747	282,118,438
Interest on current liabilities . .	11,531,695	13,945,009
Rents paid for lease of road . . .	110,651,265	(see note b)
Taxes	55,181,011	61,696,354
Permanent improvements charged to income account . . .	30,295,520	(see note c)
Int. on real estate mortgages . . .	581,158	
Other deductions	42,393,886	(see note d)
Total \$	484,875,282	\$ 357,759,801
Available for dividends, ad- justments and improvements . . .	325,288,181	327,445,666
Dividends	188,214,544	183,754,236
Available for adjustments and improvements	137,073,637	(e) 143,691,430

Note (a). This figure for 1904 represents only "clear income from investments." The gross "income from other sources" that year was \$212,933,990 which would have increased the total earnings and income to \$2,188,108,081, pronounced by the statistician "a fictitious figure."

Note (b). The "rents paid for lease of road" by operating Companies in 1904 amounted to \$109,948,651.

Note (c). "Permanent improvements charged to income account" by the same companies in 1904 amounted to \$35,682,363.

Note (d). "Other deductions" by the same companies in 1904 amounted to \$41,321,823.

Note (e). In 1904 this amount comprised the following items: "Permanent improvements \$38,522,548; advances to cover deficits in operation of weak lines (estimated) \$5,000,000; miscellaneous deductions \$43,439,551; surplus \$56,729,331."

Aside from the story told by the table itself and the accompanying notes the above summaries show that the railways in 1905 had a more prosperous year than in 1904. The earnings from operation alone, exclusive of income from investments and other sources, for 91.12 per cent of the mileage was \$1,962,797,637 or within \$12,376,454 of the final total for 1904.

The expense of operating the 193,404 miles of line in 1905 was \$1,261,164,397 or 64.25 per cent of the gross earnings against the proportion of 67.79 of operating expenses to earnings in 1904.

The ratio of operating expenses to earnings for 1905 will doubtless be materially increased by the returns from the roads not heard from.

According to the brief preliminary statement issued by the Commission, December 14, 1905, covering "presumably about 99 per cent of the mileage" to be included in its final report, the gross earnings of 214,477 miles of line were \$2,073,177,325, the operating expenses were \$1,383,584,404 and the operating ratio of expenses to earnings was 66.74 per cent.

The salient feature of the above summaries is the disposition of the net balance of the earnings from operation. Less income from other sources, which it is evident can be varied to suit the particular statistician's theories, the net income received from the public for services rendered in 1905, was \$701,633,240. If from this be deducted the \$484,875,282, the sum of the items which in the Commission's reports are designated as "fixed charges," the amount "available for dividends, adjustments and improvements" is \$216,757,958 and not \$325,288,181 as in the summary. This indicates that were it not for "income from other sources" the railways in the prosperous year of 1905 would not have been able to pay the net dividends of \$188,214,544, much less the gross dividends (including duplications) which will probably reach \$230,000,000.

The \$234,240,747 interest on funded debt is equivalent to 4.39 per cent on the bond capitalization of the 201 operating roads reporting to this bureau. The \$188,214,544 net dividends is equivalent to 3.78 per cent on their total capital stock.

The aggregate of interest and dividends \$422,455,291 is equivalent to 4.10 per cent on their gross capitalization. This sum which is the share of capital in the earnings of the railways

amounts to 21.52 per cent of their gross earnings, while the compensation of employes, as appears later on, absorbed 40.06 per cent of such earnings.

In the official report for 1904 no less than three amounts are given as representing the interest on funded debt, namely: \$282,118,438, as "net interest," \$244,179,326 as interest on debt of operating companies, and \$297,674,738, the sum of the interest on debts of operating and operated companies. No explanation is vouchsafed as to how the net interest is arrived at. In the case of interest on current liabilities the figures for gross and net interest are identical. In reality the interest and other charges paid by the "operated" companies come out of the rental or other income paid them by the operating companies.

DISTRIBUTION OF GROSS EARNINGS IN 1904.

How the above gross earnings of \$1,975,174,091 for the year 1904 was distributed is shown by the following table:

Pay of employes	\$ 817,598,810	41.40
Fuel for locomotives	158,948,886	8.05
Oil and supplies for locomotives	8,812,368	.44
Taxes	61,696,354	3.17
Permanent improvements	38,522,548	1.95
Miscellaneous deductions	43,439,551	2.20
Deficits in operating weak lines	5,000,000	.25
Material for		
Locomoitves, renewals and repairs ..	45,000,000	2.27
Freight car renewals and repairs	44,000,000	2.22
Passenger car renewals and repairs ...	14,000,000	.71
Bridges	18,000,000	.91
Rails	12,000,000	.60
Ties	23,000,000	1.16
Ballast and repairs to roadway	20,000,000	1.01
Buildings	15,000,000	.76
Loss and damage	17,002,602	.87
Payments for injuries to persons	15,838,179	.80
Hire of equipment, car service, etc.	26,079,295	1.32
Rents for tracks, yards and terminals ...	19,694,025	.99
Rents of buildings and other property...	5,103,561	.25
Train and station supplies	31,139,076	1.57

Shop tools, repairs and renewals	9,411,076	.48
Law expenses	6,856,870	.35
Stationery and printing	11,789,640	.59
Advertising	5,937,816	.30
Miscellaneous expenses	19,003,145	.96
Interest on bonds and current liabilities	296,063,447	14.99
Dividends	183,754,236	9.30
Surplus income	2,482,606	.13
Total	<u>\$1,975,174,091</u>	<u>100.00</u>

It is evident from the above that but for the very conservative estimate of the cost of material for renewals, repairs, etc., there would have been no surplus income from the earnings from operation in 1904. Such surplus as the statistician shows, \$56,729,331, must therefore have come from "income from other sources" than operation.

SUMMARY OF RESULTS.

The two tables preceding the last yield the following most significant data concerning railway operation during the year 1905:

Percentage of operating expenses to operating income...	64.25
Revenue per passenger per mile, cents.....	1.961
Revenue per ton of freight per mile, cents.....	.757

The only one of these figures liable to material change in the final returns is that relating to the percentage of cost of operation to operating income. The average revenue per passenger and per ton mile are likely to be slightly increased by the complete returns.

How these figures compare with like results in former years is shown in the following table:

	Operating Cost to Operating Income Per cent	Revenue per Passenger-Mile (cents)	Revenue per Ton-Mile (mills)
1905.....	64.25	1.961	7.57
1904.....	67.79	2.006	7.80
1903.....	66.16	2.006	7.63
1902.....	64.66	1.986	7.57
1901.....	64.86	2.013	7.50
1900.....	64.65	2.003	7.29
1899.....	65.24	1.978	7.24
1898.....	65.58	1.973	7.53
1897.....	67.06	2.022	7.98
1896.....	67.20	2.019	8.06
1895.....	67.48	2.040	8.39
1894.....	68.14	1.986	8.60
1893.....	67.82	2.108	8.78
1892.....	66.67	2.126	8.98
1891.....	66.73	2.142	8.95
1890.....	65.80	2.167	9.41
1899.....	66.81	2.165	9.22
1888.....	65.34	2.349	10.01

If the revenue per ton mile had been the same in 1905 as in 1888 the American people would have paid no less than \$441,114,-921 more for the transportation of their freight last year than they did pay. Even had it remained at the low figure of only a decade ago the cost of transporting the freight of the United States in 1905 would have been \$148,243,539 more than it was.

This in the face of the persistence of the operating ratio in the neighborhood of 66 is one of the marvels of railway economics.

In calling attention to the fact that the lowest point reached by the per ton mile unit was 7.24 mills in 1899, the official statistician in his report for 1904, said: "It must be remembered in this connection that changes in the rate per ton mile may depend quite as much upon the change in the character of the freight and in the conditions under which freight is carried as upon a change in the tariff rates."

The following shows what changes have taken place in the character of the freight carried between 1899 and 1904:

LOW RATE COMMODITIES.

	Per cent of Aggregate Tonnage.	
	1904.	1899.
Products of agriculture	9.59	11.33
Products of animals	2.74	3.12
Products of mines	51.56	51.47
Products of forests	12.53	10.89
Total low rate commodities.	76.42	76.81

HIGHER RATE COMMODITIES.

Manufactures	13.41	13.45
Merchandise	4.83	4.49
Miscellaneous	5.34	5.25
	23.58	23.19

Note should be made of the fact that not only has there been an increase in the proportion of higher class freight carried, but that the increase was wholly in the two classes which pay the highest rates—Merchandise and Miscellaneous. In the years intervening between 1899 and 1904 there was an even more marked increase in the proportion of high grade freight, the percentage being 24.13 in 1902 and 24.58 in 1903.

TAXES

In 1905 the railways reporting to this bureau paid taxes to the amount of \$55,181,011.

In 1904 the official statistician reported that all the operating companies in the country paid \$56,801,756 which, with \$4,894,598 paid directly by the operated companies made a total for that year of \$61,696,354, all of which came out of the earnings. On the commercial valuation of railway property made by the same statistician for the Census Bureau in 1904 "the rate of taxation imposed upon railway property is \$5.37 per \$1,000."

There is no authoritative information as to the rate paid by other species of property, but the manufacturing, industrial and commercial enterprises paying anything like \$5.37 per \$1,000 on full valuation of their property and amounting to over 3 per cent of their gross earnings are few and have just reason to complain of unequal taxation.

The taxes paid in 1905 by the 201 companies reporting to this bureau amounted to nearly 8 per cent. of their net earnings from operation, and were equal to more than 29 per cent. of the dividends paid by such operating companies.

RAILWAY EMPLOYEES.

No other division of railway statistics surpasses in importance from a social, economic and industrial point of view that which relates to the number, compensation and conditions of labor of railway employes. The efficiency of the railway service depends on the sufficiency and efficiency of their numbers—not always coincident. Their compensation precedes all other charges against railway earnings of which it absorbs over 40 per cent.

The following summary gives the number of employes on the pay-roll of 91.12 per cent of the railways on June 30, 1905, by classes in comparison with the final figures on the same date in 1904:

Class	1905. 91.12 Per cent.	1904 Final Report.
General officers	2,838	5,165
Other officers	4,893	5,375
General office clerks	48,048	46,037
Station agents	31,333	34,918
Other station men	117,635	120,002
Enginemen	50,291	52,451
Firemen	53,229	55,004
Conductors	37,626	39,645
Other trainmen	102,408	106,734
Machinists	44,512	46,272
Carpenters	52,292	53,646
Other shopmen	168,048	159,472
Section foremen	34,564	37,609
Other trackmen	284,072	289,044
Switch tenders, crossing tenders, and watchmen	41,340	46,262
Telegraph operators and dis- patchers	30,126	30,425
Employes—account floating equip- ment	8,452	7,495
All other employes and laborers . . .	167,998	160,565
Total employes	1,279,705	1,296,121
One road not distributed	4,737	
Total	1,284,442	1,296,121

The total of 1,284,442 employees for 91.12 of the mileage in 1905 would indicate that final reports will show that there were about 1,410,000 employees on the pay-rolls of all the railways June 30th last, an increase of 113,879 over the preceding year.

The disproportionately small number of general officers in 1905 is accounted for by the fact that there were only 201 operating companies reported to this bureau, while the final report to the Commission in 1904 covered 848 independent operating roads and a total of 2,104 of all kinds operating, subsidiary, etc. This inclusion multiplies the number of general officers out of all proportion to the number of miles operated or other classes employed.

In 1905 there were 664 employees per 100 miles of line operated against 611 in 1904 and 639 in 1903—the highest number up to that year.

COMPENSATION OF EMPLOYEES.

The following summary shows the total compensation of the employees enumerated in the last preceding table for the years named in comparison with like data for 1897:

COMPENSATION.

CLASS.	1905.	PER CENT.	1904.	1897.	PER CENT.
General Officers	12,852,909	1.63	14,475,126	12,304,161	2.64
Other Officers	10,422,684	1.33	10,816,880	6,687,804	1.44
General Office Clerks	35,507,154	4.51	34,735,708	19,368,653	4.16
Station Agents	20,930,055	2.66	22,584,269	17,221,177	3.70
Other Station Men	63,290,460	8.04	66,318,729	38,428,242	8.25
Enginemen	65,763,392	8.35	68,946,543	40,948,169	8.80
Firemen	38,813,187	4.93	40,463,040	23,316,883	5.01
Conductors	41,741,431	5.30	44,150,760	24,500,832	5.26
Other Trainmen	72,123,655	9.16	75,521,384	37,535,000	8.06
Machinists	35,639,256	4.53	37,344,571	18,442,257	3.96
Carpenters	34,202,800	4.35	36,654,270	21,971,689	4.72
Other Shopmen	96,822,317	12.29	94,463,049	47,463,543	10.19
Section Foremen	20,942,383	2.66	22,555,363	17,100,569	3.67
Other Trackmen	95,184,781	12.09	104,600,785	54,008,065	11.60
Switch Tenders, Cross- ing Tenders, and Watchmen	24,034,983	3.05	26,920,495	24,410,195	5.24
Telegraph Operators and Dispatchers	21,408,216	2.72	21,770,296	13,579,209	2.92
Employees—account Floating Equipment	5,441,531	.69	4,884,713	3,589,254	.77
All other Employees and Laborers	89,710,889	11.39	90,392,829	44,725,879	9.61
One Road not dis- tributed	2,548,166	.32	.....	.....	.....
Total	787,380,029	100.00	817,598,810	465,601,581	100.00

Proportionate compensation for the roads not included in the column for 1905 would increase the total for that year to about \$864,000,000, an increase of over \$46,000,000, making a total increase in the compensation of railway employes in the last three years of \$187,570,218. During the same period net interest on funded debt and dividends increased about \$84,000,000, thus showing that labor has profited twice as much as capital from the increased earnings of railroads during the past three years.

Compared with 1897, when the freight revenue per ton per mile was 7.98 mills against 7.57 in 1905, the final figures for 1905 will show an approximate increase of \$398,000,000 or 85 per cent increase in the compensation of railway employes against an increase of 587,000 or 71 per cent increase in their numbers. There is material in these comparisons which as the official statistician has said is "essential for a proper appreciation of many questions of public economy."

The column of percentages for 1905 and 1897 affords a valuable indication of the relative share of each class in the 40 per cent of the gross earnings of the railways.

AVERAGE DAILY PAY.

The tendency of wages received by the various classes of railway employes for the years 1905 and 1904 in comparison with the average daily compensation of the same classes in 1897 is shown in the following summary:

	1905. Daily Average Compensation	1904. Daily Average Compensation	1897. Daily Average Compensation
General officers	\$14.98	\$11.61	\$9.54
Other officers ..	6.17	6.07	5.12
General office clerks ..	2.26	2.22	2.18
Station agents ..	1.96	1.93	1.73
Other station men ..	1.72	1.69	1.62
Enginemen ..	4.16	4.10	3.65
Firemen ..	2.39	2.35	2.05
Conductors ..	3.54	3.50	3.07
Other trainmen ..	2.31	2.27	1.90

Machinists	2.61	2.61	2.23
Carpenters	2.26	2.26	2.01
Other shopmen	1.92	1.91	1.71
Section foremen	1.79	1.78	1.70
Other trackmen.....	1.32	1.33	1.16
Switch tenders, crossing tenders and watchmen.....	1.78	1.77	1.72
Telegraph operators and dispatchers	2.20	2.15	1.90
Employes, account floating equipment	2.17	2.17	1.86
All other employes and laborers	1.84	1.82	1.64
All employes	2.07	No information.	

As the final figures for 1905 are liable to vary these averages, especially in the case of general officers, definitive comparisons should be confined to 1904 and 1897. These show that in all the more important classes of railway employment there has been a positive increase of from 10 to 20 per cent. Nor does this fully represent the increase to the individual employe for the increase in the daily average is retarded by the fact that the number of employes is always recruited at the bottom, where the average compensation is necessarily lowest.

Moreover, the figures do not show how many days the men averaged in 1904 as compared with 1897. In 1905 the returns to this bureau giving 1,284,442 as the number of employes on the pay-roll on June 30th, also show that all employes worked 379,198,632 days during the year ending that date, an average of over 295 days per man, which excluding Sundays and holidays is practically up to the limit of constant employment. Information is not officially available for 1897, but it is public knowledge that no such full time prevailed in railway employment that year.

It should be noted that there is a margin for error in the above calculation as to days worked, because the number of employes is taken from one month's pay-roll and therefore does not accurately represent the average number of employes throughout the year. In 1904 this method of reporting the number of employes resulted in showing a decrease from the preceding year, whereas

the total compensation proved that there had been more men employed in 1904 than in 1903. Accuracy requires that the report call for an average of employment through the twelve months of the year.

Why "laborers engaged in the construction of *new line*" are not included in the returns of railway employees, is one of the mysteries of the official statistics.

DISTRIBUTION OF COMPENSATION.

How the number and compensation of employees in 1905 was divided among the four general accounts of Maintenance of Way and Structure, Maintenance of Equipment, Conducting Transportation and General Expense, and the percentage of each to the whole is shown by the following summary:

Object of Expenditure		Number Employed		Compensation.	
			Per Cent		Per Cent
Maintenance of way and structures	414,203		32.25	\$167,888,957	21.32
Maintenance of equip- ment	267,780		20.85	164,804,083	20.90
Conducting transporta- tion	552,907		43.04	404,377,596	51.36
General expenses	49,428		3.85	50,279,540	6.38
Not classified	124		.01	30,064	.04
Total	1,284,442		100.00	\$787,380,240	100.00

It may be of interest to compare the foregoing with the following summary of expenditures for wages of the railways of the United Kingdom in the various departments for the year 1904:

EXPENDITURES FOR WAGES ON BRITISH RAILWAYS IN 1904.

Fourteen companies (15,329 miles of line) represented.

Division.	Wages.	Per cent of whole.
In maintenance and renewal of permanent way	\$ 12,933,910	10.12
In working locomotive engines	25,891,785	20.25
In repairs and renewal of engines	11,113,040	8.69
In repairs and renewals of carriages and wagons	9,225,365	7.23
In traffic department *	68,653,833	53.71
Total	\$127,817,933	100.00
* Including "salaries and wages" and clothing.		

These figures include all the trunk lines of England and Scotland, and represent approximately 90 per cent of the total compensation to British railway employees. Such total (\$142,019,925) is equivalent to nearly 27.37 per cent of the gross earnings of all British railways in 1904. In that year the compensation of railway employees in the United States absorbed no less than 41.40 per cent of the gross traffic earnings of American railways. The contrast is significant of the difference in the share labor receives of railway earnings in the two countries.

British railway employees number 581,664, their yearly compensation averaging \$244 against a yearly average of \$613 in the United States railway service.

RAILWAY ACCIDENTS.

The following summary of accident statistics is made up from the annual statements of the railways which have been returned to this bureau for the year 1905:

Passengers.	Killed.	Injured
In accidents to trains.....	336	5,913
In other accidents	119	3,869
Employees.		
Trainmen	1,832	28,359
Other employes	1,099	6,992
Other Persons.		
Trespassers	4,591	4,973
Not trespassing	876	2,408
Total (193,404)	8,853	52,514

The aggregate number of persons reported as killed in connection with the operation of railways during the years since the Commission began collecting statistics, including those reported to this bureau for 1905, was as follows:

KILLED IN RAILWAY ACCIDENTS.

	Passengers.	Employees.	Other persons.	Total
1905	455	2,931	5,467	8,853
*1905	537	3,261	not given	
1904	441	3,632	5,973	10,046
1903	355	3,606	5,879	9,840
1902	345	2,969	5,274	8,588
1901	282	2,675	5,498	8,455
1900	249	2,550	5,006	7,865
1899	239	2,210	4,674	7,123
1898	221	1,958	4,680	6,859
1897	222	1,693	4,522	6,437
1896	181	1,861	4,406	6,448
1895	170	1,811	4,155	6,136
1894	324	1,823	4,300	6,447
1893	299	2,727	4,320	7,346
1892	376	2,554	4,217	7,147
1891	293	2,660	4,076	7,029
1890	286	2,451	3,598	6,335
1889	310	1,972	3,541	5,823
1888	315	2,070	2,897	5,282

*Commission's Bulletin No. 16, passengers and employes only.

Such statistics to be of any instructive value whatever should always be accompanied by the following summary of the passenger and freight traffic and the number of railway employes in order to comprehend their relation to the units of exposure to the risks of accident:

	Passengers carried one mile. (millions)	Tons of Freight carried one mile. (millions)	Number of Employes.
1905	22,830	180,784	1,400,000
1904	21,923	174,522	1,296,121
1903	20,915	173,221	1,312,537
1902	19,689	157,289	1,189,315
1901	17,353	147,077	1,071,169
1900	16,039	141,599	1,017,653
1899	14,591	123,667	928,924
1898	13,379	114,077	874,558
1897	12,256	95,139	823,476
1896	13,049	95,328	826,620
1895	12,188	85,227	785,034
1894	14,289	80,335	779,608
1893	14,229	93,588	873,602
1892	13,362	88,241	821,415
1891	12,844	81,073	784,285
1890	11,847	76,207	749,301
1889	11,553	68,727	704,743
1888	10,100	61,027	No information.

This table affords gratifying proof that railway fatalities are not increasing in proportion to the increase of railway traffic.

Where these three chief units in railway risks have increased during the period between 1888 and 1905, inclusive, in the following proportions:

Passengers per mile	126 per cent.
Tons of freight per mile	196 per cent.
Number of employes	100 per cent.

—fatalities in railway accidents during the same period have only increased in the following proportion:

To passengers	70 per cent.
To employes	57 per cent.
To other persons	106 per cent.

Besides these comparisons include the complete fatalities to passengers and employes in 1905 and only 91.12 per cent of the passenger and ton mileage for that year.

Note should also be made of the fact, frequently referred to by the official statistician, that railway accidents have been more fully reported in recent years than formerly—especially since the Act of March, 1901, requiring full monthly reports of railway accidents under oath.

A cursory study of the two tables reveals in a striking manner how railway accidents follow the rise and fall in the volume of traffic.

OFFICIAL ACCIDENT STATISTICS FOR 1905.

Under the Act of March 3, 1901, the Commission issues quarterly bulletins of accidents reported to it monthly under oath by the railways. These bulletins take no note of the number of casualties to "other persons" in railway accidents.

According to Bulletin No. 16 the casualties to passengers and employes during the year ending June 30, 1905, were as follows:

PASSENGERS.		
In accidents to trains.	Killed.	Injured.
Collisions	198	3,493
Derailments	151	2,891
Miscellaneous	1	114
<i>Not in train accidents</i>		
Falling from cars or engines or while getting on or off	134	1,732
From overhead or side structures	8	38
Other causes	45	1,772
Total accidents to passengers	537	10,040
EMPLOYES.		
In accidents to trains.		
Collisions	410	3,618
Derailments	305	1,947
Miscellaneous	83	1,487
<i>Not in train accidents.</i>		
Coupling and uncoupling	243	3,110
Attending switches and other work about trains	258	12,598
From overhead or side structures	92	1,185
Falling from cars or engines or while getting on or off	633	9,237
Other causes	1,237	12,244
Total accidents to employes	3,261	45,426
Total passengers and employes	3,798	55,466

It will be observed that 1,282 or one-third of the fatalities charged to the railways in 1905 fall under the blind and uninformative head of "other causes," that 767 resulted from "falling from cars or engines or while getting on or off," and that 2,700 or nearly three-quarters of the fatalities were "*not* in accidents to trains." The remaining 1,098 fatalities are chargeable to "accidents to trains."

These last figures constitute in themselves a sufficiently terrible record to call for the adoption of the most effective means for the protection of railway trains, without confusing them in the public mind with the total fatalities which attend railway operation as they attend every other industry employing such vast forces and numbers.

Statistics of railway accidents are either helpful or harmful as they aim to prevent their recurrence or are merely published to cater to a morbid popular appetite for sensation.

In Great Britain the quarterly returns of railway accidents to the Board of Trade are accompanied by the reports of official inspectors as to their causes fixing responsibility and recommending preventive measures in appliances or regulations.

In the United States there is no such investigation by experts into the causes of railway accidents, the statistics are given to the press in a sensational form and attention is directed too exclusively to automatic safety devices instead of the rigid enforcement of rules without which the best safety devices are vain. A majority of the worst railway accidents of 1905 occurred on lines protected by block signals.

GENERAL SAFETY OF RAILWAY TRAVEL.

If statistics were needed to reassure the public as to the general safety of American railway travel they could very easily have been furnished to the press along with the summaries of accidents. Unfortunately these summaries have usually stopped with bald and sensational aggregates of killed and injured and now the Commission is urging the abolition of the annual reports of accidents which are the only ones which permit of relative analysis with the enormous aggregate traffic to which accidents are an inseparable incident.

To illustrate the general safety of American railways, 104 roads reporting to this bureau in 1905 show the following remarkable immunity from fatalities to passengers in train accidents:

ROADS ON WHICH *NO* PASSENGER WAS KILLED IN TRAIN ACCIDENTS IN 1905.

Number operating companies	104
Mileage of 104 companies	104,596
Passengers carried	362,795,534
Passengers carried 1 mile	10,909,856,254
Tons of freight carried	372,214,167
Tons of freight carried 1 mile	47,535,935,531
Passengers killed in train accidents	none.
Passengers injured in train accidents	1,683

Thirteen other roads reporting to this bureau having only one fatality each to passengers in train accidents afford the following showing of comparative safety:

ROADS ON WHICH *ONE* PASSENGER EACH WAS KILLED IN TRAIN ACCIDENTS IN 1905.

Number of operating companies	13
Mileage of operating companies	33,268
Passengers carried	113,685,234
Passengers carried 1 mile	4,688,312,331
Tons of freight carried	131,053,807
Tons of freight carried 1 mile	25,678,085,628
Passengers killed in train accidents	13
Passengers injured in train accidents	927

Combined, these tables yield the following:

Number of operating companies	117
Mileage of operating companies	137,864
Passengers carried	476,480,768
Passengers carried 1 mile	15,598,168,585
Tons of freight carried	503,267,974
Tons of freight carried 1 mile	73,214,021,159
Passengers killed in train accidents.	13
Passengers injured in train accidents	2,610

In the first of these tables, of roads having *NO* passengers killed in train accidents, is represented a mileage and traffic greater than the combined mileage and traffic of Germany, France, Russia in Europe, and Italy; in the second is represented a mileage and traffic greater than that of the combined railways of Austria, Hungary and Spain; and in the third is represented a mileage and traffic greater than that of the combined railways of Great Britain, Germany, France, Russia in Europe, Austria, Norway and Sweden.

The true relation of railway accidents to passenger travel in the United States is partly disclosed in the following table of number of passengers carried one mile for one killed during the period for which statistics have been kept:

PASSENGERS CARRIED ONE MILE FOR ONE KILLED.

1905, approximate	45,000,000
1904, official report	49,712,502
1903	58,917,645
1902	57,072,283
1901	61,537,548
1900	64,413,684
1899	61,051,580
1898	60,542,670
1897	55,211,440
1896	72,093,963
1895	71,696,743
1894	44,103,228
1893	47,588,966
1892	35,542,282
1891	43,789,143
1890	41,425,823
1889	37,200,000
1888	32,063,000

The vagaries of railway casualties to the opportunities for accident strikingly illustrated in the foregoing table caused the official statistician as early as 1891 to remark:

"These facts seem to indicate that density of traffic has little to do with rate of casualties, but that the character of the equipment and the degree of intelligence among employes are the most important factors."

In his report for 1892 he said:

"Independently of character of employment and the rules by which running trains are managed, railway accidents depend upon two facts, namely, quality of labor and density of business."

The remarkable decrease in the ratio of killed to passengers carried one mile in 1895, was attributed to the dropping out of the "incompetent and inefficient" employes attending the retrenchment of the preceding year and to "the fact that the demands upon the passenger service during the present year have been somewhat decreased."

From 1897 to this day, these conditions have been reversed. The demands on the passenger service have become more severe and exacting both as to accommodations and speed; while the recruiting of new and unexperienced men into the service has proceeded at an average rate of over 73,000 men per year. The inevitable effect of such conditions can be traced in the foregoing table, which shows an increase in the ratio of fatalities to traffic in spite of the fact that 32,818 miles of line are wholly and 44,574 miles are partially protected by the block signals, whereas in 1891, the official statistician remarked that "At present a very small portion of the railway system of the United States is operated on the block system."

It is therefore evident that the block system, now installed on nearly all the roads with heavy traffic, is not the primary essential to safe railway operation that the Commission, and the inventors and manufacturers of patent safety appliances continually represent it to be, but that competent, conscientious and experienced employes are.

Statistics, schools and legislatures cannot provide these last. They come through careful selection and training. Experience cannot be taught outside of the school which confronts the inexperienced tyro with the responsibility to act in the inevitable emergency which comes unheralded.

The statistics of railway accidents record the coincidence of such emergencies with the failure of the men or the equipment to meet them. They fail to record the billions of opportunities for disaster passed with safety.

The chief reason why the Commission and the official statistician have been unable to discuss railway accidents profitably has been their failure to recognize the predominating influence of freight traffic on the safe handling of passenger trains. An analysis of the 87 "prominent" collisions reported in the quarterly Accident Bulletins of the Commission for 1905, classifies them as follows:

Kind of Train in Collision	Number of Collisions	Killed	Injured
Passenger and Passenger	12	107	592
Passenger and Freight	30	145	614
Freight and Freight	47	48	149
Total	89	300	1,355

It will be observed that there were more than twice as many collisions between passenger and freight trains as between passenger trains only, and that the fatalities were greater in spite of the fact that there were 24 passenger trains involved in the collisions of passenger trains to ~~only 10~~ in the collisions with freight trains.

It will also be noted that the "prominent" collisions between freight trains outnumber those of the other classes combined, although happily the loss of life was not so great.

How unaccountable are the elements entering into the risk of railway travel may be judged from the following table of casualties to passengers in train collisions during the four quarters of 1905, the most fatal year in the passenger record:

Quarterly Bulletins.	Casualties in Collisions.	
	Killed.	Injured.
For July, August and September, 1904	124	1,201
For October, November and December, 1904 . . .	51	899
For January, February and March, 1905	18	834
For April, May and June, 1905	5	549
Total for year	198	3,483

No previous first quarter of the year shows within 60 per cent of the fatalities here recorded for the first quarter of 1905; and no previous last quarter shows within 100 per cent as few.

The only conclusion to be drawn from such variations is that the conditions accounting for railway accidents lie for the most part outside the realm of statistics, and that it is not safe to generalize as to the causes of accidents from the distressing numbers of the killed and injured.

RAILWAY ACCIDENTS IN FOREIGN COUNTRIES.

As it is popular to make invidious comparisons between railway accidents in the United States and Europe, it may be pertinent to present here the latest available statistics from official sources on the subject. Omitting the injured, because the definition of what constitutes a reportable injury varies with every country, the figures from the British Blue Book, issued last October, are as follows:

Country.	Year.	Killed in Railway Accidents.		
		Passengers	Employes	Other Persons.
United Kingdom to June 30,	1905	138	436	587
Russia in Europe	1902	115	392	897
Germany	1903	73	494	293
France	1903	(a) 3	219	(b) 256
Austria	1903	9	76	82
Hungary	1903	9	64	109
Italy	1902	8	83	63
Spain	1898	12	26	91
Portugal	1903			(c) 37
Sweden	1902	6	26	63
Norway	1904	2	2	5
Denmark	1904			(d) 29
Belgium	1903	5	37	70
Holland	1903	4	29	23
Switzerland	1903	21	24	32
Romania	1903	7	12	28
Totals ..		412	1,920	2,665

(a) In accidents to trains only.

(b) Excluding suicides, but including passengers killed otherwise than in accidents to trains.

(c) Including passengers and employees.

(d) Including employees.

In comparing these figures with American statistics of accidents, it should be remembered that our passenger mileage is about one-half and our ton mileage more than double that of all Europe, the average speed of our trains greater and the railway right of way over there is not used as a public highway.

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RAILWAY STATISTICS **OF THE** **UNITED STATES OF AMERICA**

FOR THE YEAR ENDING JUNE 30

1906

COMPARED WITH

THE OFFICIAL REPORTS OF 1905
AND
RECENT STATISTICS OF FOREIGN RAILWAYS

PREPARED FOR THE
GENERAL MANAGERS' ASSOCIATION OF CHICAGO

By **SLASON THOMPSON**
BUREAU OF RAILWAY NEWS

CHICAGO:
GUTHORP-WARREN PRINTING COMPANY
1907

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INTRODUCTORY

BUREAU OF RAILWAY NEWS,

CHICAGO, February 12, 1907.

Reports, covering the most significant pages of their returns to the Interstate Commerce Commission, have been made to this Bureau by 313 operating railways in the United States. These railways represent 206,960 miles, or, approximately, 94 per cent of the aggregate mileage, and an even larger percentage of the total traffic of the country.

For all practical purposes the summaries prepared from these reports may be accepted as representative of our great transportation industry, because the remaining six per cent consists of a multitude of small roads, which serve as feeders to the great systems, without affecting the statistics materially one way or another.

The publication of the data herein contained for the year 1906 has been delayed in order to make comparisons with the official figures for the year 1905, which were not available before January 24, 1907—by a noteworthy coincidence, the same day on which the full report of the Railroad Commissioners of Maine for the year ending June 30, 1906, was received. Prior to that date, all the country knew of the details of the railway situation for the year ending June 30, 1905, was obtained from the report of this Bureau in January, 1906, and from the skeleton of a report "For the Press," given out by the Commission on September 21, 1906.

The advance sheets of "Poor's Manual" for the calendar year 1905, covering returns six months later than those given by the Commission's latest figures, were given to the press on November 6th last.

As indicating the greater promptness with which railway statistics are handled in England, it may be noted that "The General Returns of British Railways to the Board of Trade" for the year ending December 31, 1905, was published last August. It makes a large "blue book" of 151 pages, 8½ x 13 inches each.

On November 22nd last, the Interstate Commerce Commission issued what was called its preliminary report on the income account of the railways of the United States for the year ending June 30, 1906. The following are the only facts contained in this preliminary report:

Operated mileage reported.....	220,026
Percentage of total, about.....	99
Gross earnings.....	\$2,319,760,030
Operating expenses.....	1,532,163,153
Passenger earnings.....	618,555,934
Freight earnings.....	1,640,942,862
Income from other sources.....	132,624,982
Interest, rents, taxes and other charges.....	590,386,554
Dividends.....	229,406,598
Surplus.....	100,428,707
Taxes.....	68,903,288

Nothing was vouchsafed giving a glimmering of the living questions of public service, equipment, capitalization, cost of construction, number of passengers, tons of freight, average fares and freight receipts, number and compensation of employes, etc. Nothing that might enable the reader to form a just estimate as to how the railways were fulfilling their duty as common carriers.

The date on which this preliminary report was made public is noteworthy, for it proves that within five months after the close of the fiscal year the Commission was in possession of reports from 99 per cent of the railways of the United States, and with reasonable dispatch might have had its report through the printers' hands by this time. Unless greater expedition is shown this year than last, the public will know nothing further from these official statistics of railways for 1906 until the abstract of the final report is issued "For the Press" some time next September.

The Commission must be given credit for publishing one division of railway statistics with conspicuous, if not impartial, promptitude. Its quarterly "Accident Bulletin" appears, with an approach to regularity, about four months after the date of the last accident it records. But these bulletins deal only in the ghastly totals of killed and injured, without any enlightening figures as to traffic conditions that account for their increase or decrease, or facts derived through official investigation into their causes.

SCOPE OF THE BUREAU'S WORK.

Encouraged by the success that attended the initiation of this effort to furnish a succinct and timely review of railway statistics for each fiscal year, as contained in the official reports to the Interstate Commerce Commission, its scope in 1906 was extended to embrace returns from operating roads of 50 miles and over. The result has been an increase of 13,556 miles in single track mileage covered and a material broadening of the representative character of the summaries.

By dealing solely with operating roads, these summaries reflect more accurately the great transportation industry of the United States than if they were cumbered and confused with the thousand and one subsidiary organizations that merely serve to swell the totals with duplications of capital, income and dividends without having the slightest bearing on the railway situation.

Where the reports to this Bureau for 1905 covered 202 roads with a single track mileage of 193,404 miles, those for this year include 313 roads with 206,960 miles of line.

They embrace every important railway system in the country, and their comprehensive character is proved by the fact that in 1906 these 313 roads operated 297,720 miles of track of all kinds, against a final total of 306,796 for the whole United States in 1905.

For the sake of brevity, the Interstate Commerce Commission will be referred to herein as the "Commission;" the Commission's "Statistics of Railways in the United States" as "Official Statistics," and "the year ending June 30" will be implied before the figures of the year specified, unless otherwise stated.

It is believed that the new data in regard to railway equipment, capitalization and cost of construction given herewith will prove of special public interest at this time. Also the comparative data in regard to railway accidents and railway wages in the United States and Europe.

1

MILEAGE

The aggregate railway mileage in the United States on June 30, 1905, for which the Commission had substantially complete returns, was 216,973 miles, of which 7,569 was operated under trackage rights. This is known in railway statistics as single track mileage—that is to say, it excludes second track, third track, fourth track and yard track and sidings. Including these, the aggregate of all tracks in the United States in 1905 was 306,796 miles.

The single track mileage covered in the following pages for the year ending June 30, 1906, aggregates 206,960 miles, or 94 per cent of the mileage included in the Commission's preliminary report referred to in the Introduction, or 95 per cent of the total given in the final official report for 1905.

Classified by states and territories, this mileage, in comparison with the official figures for 1905, including an assignment of this mileage by states to territory and population, was distributed as follows:

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES.

State or Territory	1906 Operated	1905 Owned	Miles of Line	
			Per 100 Square Miles of Territory	Per 10,000 Inhabi- tants
Alabama.....	4,427	4,776	9.42	24.45
Arkansas.....	3,482	4,183	7.97	29.70
Calif. nia.....	5,609	6,477	4.17	40.35
Colorado.....	5,020	5,027	4.85	85.80
Connecticut.....	1,019	1,018	21.01	10.32
Delaware.....	343	335	17.08	16.71
Florida.....	2,689	3,590	6.69	63.22
Georgia.....	5,674	6,442	11.04	27.07
Idaho.....	1,398	1,465	1.74	83.55
Illinois.....	12,188	11,830	21.13	22.61
Indiana.....	6,786	6,915	19.29	25.36
Iowa.....	9,882	9,871	17.83	40.83
Kansas.....	9,066	8,841	10.82	55.40
Kentucky.....	2,933	3,286	8.34	14.31
Louisiana.....	3,194	4,011	9.11	27.58
Maine.....	1,804	2,028	6.78	26.91
Maryland.....	1,282	1,434	14.62	11.18

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES AND TERRITORIES—Continued.

State or Territory	1906 Operated	1905 Owned	Miles of Line	
			Per 100 Square Miles of Territory	Per 10,000 Inhabi- tants
Massachusetts.....	2,087	2,119	28.36	6.96
Michigan.....	8,297	8,789	15.31	33.46
Minnesota.....	7,840	7,992	10.18	42.42
Mississippi.....	3,489	3,672	8.00	22.02
Missouri.....	8,092	8,039	11.71	23.86
Montana.....	3,188	3,309	2.28	125.28
Nebraska.....	5,856	5,833	7.59	50.40
Nevada.....	1,079	1,180	1.08	255.52
New Hampshire.....	1,213	1,267	14.07	28.36
New Jersey.....	2,172	2,224	30.22	11.12
New York.....	7,857	8,336	17.51	10.56
North Carolina.....	3,369	4,210	8.76	20.70
North Dakota.....	3,712	3,233	4.61	93.34
Ohio.....	8,920	9,259	22.74	20.54
Oregon.....	1,643	1,813	1.92	40.41
Pennsylvania.....	10,133	11,043	24.80	16.31
Rhode Island.....	190	212	20.12	4.56
South Carolina.....	2,885	3,160	10.54	21.86
South Dakota.....	3,117	3,067	3.99	70.35
Tennessee.....	3,354	3,561	8.56	16.30
Texas.....	11,629	11,983	4.59	36.40
Utah.....	1,739	1,774	2.20	60.15
Vermont.....	924	1,058	11.63	28.50
Virginia.....	3,713	3,950	9.90	19.73
Washington.....	3,168	3,367	5.07	60.26
West Virginia.....	2,597	2,929	12.12	28.71
Wisconsin.....	6,600	7,211	13.24	32.11
Wyoming.....	1,229	1,247	1.28	124.37
Arizona.....	1,665	1,821	1.63	138.47
District of Columbia.....	35	32	53.17	1.05
Indian Territory.....	2,426	2,638	8.51	61.95
New Mexico.....	2,362	2,534	2.07	119.40
Oklahoma.....	2,677	2,625	6.76	60.74
United States.....	206,960	217,017	7.34	26.44

Any study of railway statistics or legislative regulation which ignores the wide divergence of ratios to area and inhabitants, in the above statement, must inevitably fail to arrive at sound and effective conclusions. The difference between the railway conditions in Rhode Island and Nevada, for instance, only emphasizes the difficulty of generalizing as to methods of operation, facilities, fares and rates in the United States. The figures, as to the several states, as well as of the United States, should be studied in connection with like data for European railways on page 9.

It will be perceived that the mileage returned to this Bureau in 1906 equals or exceeds the official mileage for 1905 in Connecticut, Delaware, Illinois, Iowa, Kansas, Missouri, Nebraska, North and South Dakota, District of Columbia and Oklahoma. It also approaches it very closely in several other states.

The variation of 44 miles in the total for 1905 in the above table from the 216,973 miles given elsewhere as the official mileage for that year, is due to some difference in the reports as to mileage "owned" and "operated." The last named total is that which is treated herein as the final mileage for 1905.

The next summary shows the railway mileage as it is classified by length of single track, second track, third track, fourth track, or yard track and sidings, as covered by the returns to this Bureau for 1906 in comparison with official statistics for the two preceding years:

SUMMARY SHOWING ALL TRACKS.

	1906 Miles	1905 Miles	1904 Miles
Single track.....	206,960	216,973	212,243
Second track.....	17,528	17,056	15,824
Third track.....	1,752	1,610	1,467
Fourth track.....	1,217	1,216	1,047
Yard track and sidings.....	70,265	69,941	66,492
Total mileage (all tracks).....	297,720	306,796	297,073

Attention is called to the fact that while the returns for 1906 represent only 94% of the single track mileage they show an absolute increase over the figures for 1905 of 470 miles of second track, 132 miles of third track and 324 miles of yard track and sidings. The result of these full returns of extra tracks is that the total trackage in 1906 is equal to 97% of the total for 1905, and exceeds that for 1904 by 647 miles. It is in these figures that the searcher after truth will look for the secret of the continued ability of the railways, under normal conditions, to meet the continually expanding demands of traffic. Every additional mile of auxiliary track multiplies the capacity of the single track mileage.

It is apparent from the above statement, taken in connection with the fact that there were about 222,000 miles of single track in the country in 1906, that the aggregate trackage of all kinds in the United States that year was about 315,000 miles.

According to the data compiled by the *Railway Age*, 6,067 miles of new line were constructed during the calendar year 1906. The

greatest activity in this railway extension was shown in Texas, 701 miles; Louisiana, 391; South Dakota, 389; Nevada, 360; Arkansas, 240; North Dakota, 228; Wisconsin, 219; Wyoming, 214, and California, 211. Several other states, including Florida, Georgia, Idaho, and Mississippi and the Territory of New Mexico approached the 200 mark.

RAILWAY MILEAGE IN EUROPE.

To form anything like an intelligent conception of the relation of the railways of the United States to the conditions they confront, the figures given in the preceding pages as to mileage should be studied in connection with the latest statement of like conditions in Europe, as given in "Archiv fur Eisenbatwesen" for the year 1904, as follows:

RAILWAYS OF EUROPE AND THE RATIO OF MILEAGE TO AREA AND POPULATION OF EACH COUNTRY IN 1904.

Country	Miles	Miles of Line	
		Per 100 Square Miles	Per 10,000 Inhabitants
German Empire.....	34,526	16.5	6.1
Austro-Hungary (inclusive of Bosnia and Herzegovnia). . .	24,338	9.3	5.2
Great Britain and Ireland.....	22,554	18.6	5.4
France.....	28,443	13.7	7.3
Russia in Europe and Finland.....	33,995	1.6	3.2
Italy.....	10,015	9.1	3.1
Belgium.....	4,375	38.4	6.5
Netherlands and Luxemburg.....	2,133	15.5	4.0
Switzerland.....	2,640	16.5	7.9
Spain.....	8,783	4.6	4.9
Portugal.....	1,550	4.3	2.9
Denmark.....	2,043	13.7	8.3
Norway.....	1,516	1.2	6.8
Sweden.....	7,815	4.5	15.2
Servia.....	359	1.9	1.4
Roumania.....	1,974	3.9	3.3
Greece.....	695	2.8	2.9
Turkey in Europe, Bulgaria and Roumelia.....	1,952	1.9	2.0
Malta, Jersey, Isle of Man.....	68	16.3	1.8
Total for Europe.....	189,774	5.0	4.8

By comparing these figures with those of the United States as a whole, it will be perceived that our railway mileage per square mile is 46.8 per cent greater than that of all Europe, while in the matter of mileage per 10,000 inhabitants the disparity is more than

five to one in favor of our people, although, by the same odds, unfavorable to our railways. It is this sparsity of population per mile of railway in the United States that makes passenger traffic unprofitable here except in the older and more densely settled states.

If the density of population to railway mileage in Europe be compared with that of the several states it is immediately apparent that the only states which come within hailing distance of the European average in this respect are Connecticut, Maryland, Massachusetts, New Jersey New York and Rhode Island; and the last named is the only one whose density is greater per mile of railway.

BRITISH TRACKAGE.

An interesting comparison may be made with the following statement of the trackage of the United Kingdom on December 31, 1904 and 1905, as reported by the British Board of Trade, "approximately":

DESCRIPTION OF TRACK	1905	1904
Single track (miles).....	22,870	22,601
Second track.....	12,819	12,692
Third Track.....	1,324	1,271
Fourth track.....	1,067	1,030
Fifth track.....	170	153
Sixth track.....	97	85
Seventh track.....	40	35
Eighth to thirteenth.....	44	34
Sidings.....	13,891	13,733
Total trackage.....	52,322	51,634

The United States has 50% more track in yard track and sidings alone than the total of all kinds of track in the United Kingdom.

II

EQUIPMENT

Failing to anticipate the abnormal conditions that focused public attention on the provision the railways were making to furnish cars and power for the movement of the enormous traffic in the fall of 1906, this Bureau made no effort to secure returns of their equipment during the year ending June 30, 1906. With the co-operation of the several roads, it is proposed to remedy this oversight for the current year.

The returns for the years since the Official Statistician began to give the capacity, as well as the number of cars and locomotives, afford the following view of the situation up to June 30, 1905:

LOCOMOTIVES.

CLASS	1905	1904	1903	1902
Passenger.....	11,618	11,252	10,570	10,318
Freight.....	27,869	27,029	25,444	23,594
Switching.....	7,923	7,610	7,058	6,683
Unclassified.....	947	852	799	630
Total in service.....	48,357	46,743	43,871	41,225
Increase over 1904	1,614 or 3.5 per cent			
Increase over 1903	4,486 or 10.2 per cent			
Increase over 1902	7,132 or 17.3 per cent			
Increase over 1895	12,658 or 35.4 per cent			
Increase in freight engines over 1895	7,857 or 39.2 per cent			

Since 1902, when the Commission began reporting the classification of the locomotives by tractive power, weight, grate surface, etc., it has been possible to secure the following data:

Year	Tractive Power (Pounds)	Weight—Withou Tender. (Tons)
1905.....	1,141,330,082	3,079,673
1904.....	1,063,651,261	2,889,493
1903.....	953,799,540	2,606,587
1902.....	839,073,779	2,323,877
Increase in three years.....	302,256,303	755,796
Increase per cent.....	36.02	32.52

Estimating the average tractive power of locomotives in 1895 at 17,000 pounds and their average weight, exclusive of tenders, at 50 tons, both conservative estimates, the above totals for 1905 show an increase of 534,447,082 pounds, or 88.1 per cent in tractive power and 1,294,743 tons, or 72.5 per cent in weight of engines. The probabilities are that the percentages of increase are much greater. Between January 1, 1900, and June 30, 1906, the tractive power of the engines on the Pennsylvania system increased from 73,199,933 to 166,082,441 pounds or over 126 per cent.

The increase in the weight and power of freight engines has been relatively greater, in proportion to the number, which also increased more rapidly than locomotives in other service, as shown above.

CARS.

The car equipment during the period covered by the foregoing tables as to locomotives, has undergone the following development:

CLASS	1905	1904	1903	1902
Passenger service.....	40,713	39,752	38,140	36,987
Freight service.....	1,731,409	1,692,194	1,653,782	1,546,101
Company's service.....	70,749	66,615	61,467	57,097
Total service.....	1,842,871	1,798,561	1,753,389	1,640,185
Increase over 1904.....	44,310 or 2.4 per cent			
Increase over 1903.....	89,482 or 5.1 per cent			
Increase over 1902.....	202,686 or 12.3 per cent			
Increase over 1895.....	572,310 or 45.1 per cent			
Increase in passenger cars since 1895.....	7,601 or 22.9 per cent			
Increase in freight cars since 1895.....	535,290 or 44.7 per cent			
Increase in company's cars since 1895.....	29,419 or 71.2 per cent			

As public and legislative attention is chiefly focalized on the alleged failure of the railways to meet the freight demands of the country, the following data, regarding the capacity of freight cars from the official reports since its collection was undertaken, will bear study:

FREIGHT CARS.

Year	Number	Capacity (Tons)	Average Capacity (Tons)
1905.....	1,731,409	53,372,552	31
1904.....	1,692,194	50,874,723	30
1903.....	1,653,782	48,622,125	29
1902.....	1,546,101	43,416,977	28
Increase, three years.....	185,308	9,955,575	3
Increase, per cent.....	11.9	22.9	10.7

No official figures of the capacity of freight cars ten years previous to the latest given in the preceding table are obtainable. But, from an examination of the reports of various companies, it is safe to conclude that prior to 1895 the average capacity of freight cars in the United States was below 24 tons. In 1890 the average capacity of the freight cars of the Illinois Central was 17.5 tons; in 1896 that of the Chicago, Milwaukee and St. Paul was under 21 tons; and as late as 1900 that of the Atchison, Topeka and Santa Fe was below 22 tons.

Accepting, then, 24 tons as a conservative estimate of the average capacity of freight cars in 1895, we would have the following demonstration of increased car capacity in a decade:

Year	Number	Capacity (Tons)	Average Capacity per car (Tons)
1905.....	1,731,409	53,372,552	31
1895.....	1,196,119	28,706,856	24
Increase.....	535,290	24,665,696	7
Increase, per cent.....	44.7	85.9	29.1

This increase of 85.9 per cent in car capacity and 72.5 per cent in weight of locomotives in ten years handled an increase of over 119 per cent in tonnage.

NEW EQUIPMENT IN 1906.

How the equipment reported for 1905 was reinforced during the second half of that year and the calendar year 1906 is well shown in the reports of locomotive and car construction made to the *Railroad Gazette*. The following table gives the number of locomotives and cars built in the United States and Canada during the calendar years 1905 and 1906, exclusive of those built by the railways in their own shops:

Year	Locomotives	Freight Cars	Passenger Cars
1905.....	5,491	165,455	2,551
1906.....	6,952	240,503	3,167
Total.....	12,443	405,958	5,718

In both years, and in each class of equipment, every previous record of construction was surpassed. With the activity in building and repairing in the first half of 1906, supplementing that in the second half of 1905, there is every reason to conclude that the net additions to equipment for the year ending June 30, 1906, will be found to exceed those in any year in the history of American railways. Should this be the case, the following would be a conservative estimate of the totals for the year:

	1906	1896	Ten Years Increase per cent
Locomotives:			
Number.....	51,357	35,950	42.8
Weight (tons).....	3,286,848	1,797,500	82.8
Average weight.....	64	50	28.0
Freight cars:			
Number.....	1,851,409	1,221,887	51.5
Capacity (tons).....	58,455,088	29,936,231	95.3
Average.....	32	24.5	30.6

When the extraordinary increase in the capacity of locomotives and cars during the decade shown above is augmented, as it has been, by the reduction in grades, correction of alignment and improvement in roadbeds that has been prosecuted with unceasing vigor since the business revival that followed the national election in 1896, it is small wonder that the railways were enabled to handle a freight traffic that increased 130.9 per cent during this period of expanding business.

In anticipation of precisely what occurred, the railways of the United States and Canada, during the calendar years 1905 and 1906, placed orders for a grand total of 652,115 freight cars. As seen above, 405,958 of these, or of others ordered the previous year, were delivered. This leaves an approximate balance of 246,157 cars undelivered at the close of 1906, making no allowance for the deliveries during the last two years of cars ordered previous to January 1, 1905. As Canada is represented by about 8 per cent of these orders and deliveries, and the orders include those to "Company's shops," while the deliveries do not, these figures are only valuable as showing the general condition of activity in car construction. It is safe, however, to estimate that orders for between 150,000 and 175,000 cars were carried over into 1907, fully 90% of which were for American roads.

Touching the capacity of this new car equipment, such a large proportion of it is of 40 tons that that figure may well be considered the average, as well as the standard, especially as the orders for 50 ton cars are so numerous as to counterbalance those of 30 ton capacity.

From the best information available to the Commission in 1905, there were 111,122 private cars in the United States. Whether this number is increasing or decreasing, there is no present means of knowing, but many roads are building or buying refrigerator cars on their own account.

COST OF NEW EQUIPMENT.

According to estimates made by the *Railroad Gazette*, the cost of new equipment purchased by the railways of the United States and Canada during the calendar year 1906 was as follows:

	Total Cost	Average Cost
Locomotives.....	\$101,384,000	\$14,500
Passenger cars.....	25,336,000	8,000
Freight cars.....	252,525,000	1,050
Total.....	\$379,245,000	
Total, 1905.....	260,186,000	
Increase.....	\$119,059,000	
Increase, per cent.....	45.5	

During the eight calendar years, 1899 to 1903, inclusive, the same authority reports that the following new equipment was built in the United States and Canada outside the railroad companies' own shops:

Locomotives	34,116
Passenger cars	16,813
Freight cars	1,155,025

At a conservative estimated cost of \$12,500 per locomotive, \$6,400 per passenger car, and \$850 per freight car, this equipment must have cost the railways of the United States and Canada approximately \$1,515,827,450. Deducting 10 per cent as Canada's share in this expenditure, leaves over \$1,346,000,000 expended by the railways of the United States for rolling stock during the last eight years.

SAFETY APPLIANCES.

How railway equipment in the United States is provided, almost universally, with train brakes and automatic couplers is shown by the following statement from the official report for 1905:

	Total Equip-ment	Equipped with train brakes	Equipped with automatic couplers
Locomotives.....	48,357	40,876	47,945
Cars:			
Passenger.....	40,713	40,403	40,050
Freight service.....	1,731,409	1,515,354	1,715,854
Company's service.....	70,749	37,762	67,741
Total.....	1,891,228	1,641,395	1,871,590

From this statement it appears that all but one per cent of American locomotives and passenger cars are equipped with the safety appliances required by the Commission; while 87.5 per cent of the cars in the freight service is equipped with train brakes, and over 99 per cent of them are equipped with automatic couplers. These figures show a close approach to a universal adoption of pre-scribed safety appliances.

THE BLOCK SYSTEM.

According to the figures compiled by the *Railway Age*, the mileage of railway in the United States protected by block signals at the close of the calendar year 1906 was 53,133 miles of track, distributed among the several systems of signals as follows:

System	Single Track	Two or More Tracks	Total
Automatic.....	3,632	6,111	9,743
Manual telegraph.....	33,046	8,182	41,228
Manual controlled telegraph.....	1,097	844	1,941
Staff or tablet.....			221
Total all systems.....			53,133

These figures show that there has been a gain in two years of 4,627, or 90 per cent in the miles of track protected by the automatic block signals, and of 3,609, or 9 per cent, protected by the manual block system. This would indicate that the scarcity and high wages of

intelligent employes in the United States has turned the scale in favor of the installation of automatic block signals. In which connection the following observation of W. V. Turner, of the Westinghouse Air Brake Company, on his return from a tour of investigation in England, is interesting:

"They apparently do not have much use for automatic signals, as I do not remember seeing any, and, once making inquiry about it, was told that the tower system had proved so satisfactory and safe, and that labor was comparatively cheap, therefore neither the desire nor necessity for them existed."

Mr. Turner also testified that "The British signal system is, perhaps, the most perfect in the world."

III

CAPITALIZATION

According to the official report for 1905, the par value of the securities of the railways of the United States, consisting of common and preferred stock and funded debt classified as bonds, miscellaneous obligations, income bonds and equipment trust obligations, amounted to \$13,805,258,121, or \$65,926 per mile, distributed as follows:

GROSS CAPITALIZATION IN 1905.

STOCKS		
Common	\$5,180,933,907	
Preferred	1,373,623,144	\$6,554,557,051
FUNDED DEBT		
Bonds	\$6,024,449,023	
Miscellaneous obligations	786,241,442	
Income bonds	253,707,699	
Equipment trust obligations	186,302,906	\$7,250,701,070
Total stocks, bonds, etc		\$13,805,258,121
Increase over 1904		592,133,442
Capital per mile		65,926
Increase over 1904		1,661

This capital per mile is obtained by dividing the total capitalization by 209,405, the net mileage, after deducting 7,568 miles operated under trackage rights.

NET CAPITALIZATION.

That there is a duplication of railway securities through the intercorporate ownership of railway stocks and bonds to the amount of \$2,638,152,129, is shown in the following table:

Gross capital as above		\$13,805,258,121
Railway stock owned by railways	\$2,070,052,108	
Railway bonds owned by railways	568,100,021	
Total stocks and bonds owned		2,638,152,129
Net capitalization		\$11,167,106,992
Increase over 1904		465,311,714
Net capitalization per mile		53,328

As capital expenditures in recent years have been nearly as great in constructing auxiliary tracks and sidings, as in extending lines—in 1905 there was an increase of 9,723 miles of all tracks, against only 4,196 of single track—the true measure of mileage capitalization is more justly ascertained by dividing the net capitalization by the mileage of all tracks. This yields the following:

	Net Capitalization	All Tracks Miles	Capital per mile
1905.....	\$11,167,105,992	299,228	\$37,319
1904.....	10,711,794,278	289,505	37,000
Increase.....	455,311,714	9,723	319

An increase of only \$319 a mile in the capitalization of the railways during a year of heavy expenditure, both for track-laying and equipment, to keep pace with the growth of traffic, is one of the phenomena of American railways, which might well engage the attention of fair-minded students. Spread over 300,000 miles of track, this aggregates a sum equal to one-quarter the amount expended that year for new equipment alone.

Of the gross capital stock outstanding on June 30, 1905, no less than \$2,435,470,337 or 37.16 per cent. paid no dividends, and of the total funded debt, (omitting equipment trust obligations), \$449,100,396 or 6.36 per cent., paid no interest. If these two amounts be deducted from the gross capitalization, it will be found that interest or dividends was paid on only \$10,920,687,398 of the gross capitalization.

THE VALUE OF RAILWAY PROPERTY.

Various attempts have been made to arrive at a convincing valuation of the railways of the United States. Acting as expert for the Census Bureau, Professor Henry C. Adams, Statistician to the Interstate Commerce Commission, in 1904, computed their commercial value at \$11,244,852,000.

This sum was arrived at by capitalizing the net earnings of operating railway property by a mean rate of 4.256 per cent. But such a valuation depends on too many fluctuating factors—natural and artificial; local, national and inter-national—to be accepted as anything more than a conscientious guess at the actual value of American railways. That they actually cost more than the \$11,244,852,000 valuation appears, from the official statistician's own general balance sheet for 1904, in which cost of construction is placed at \$10,784,449,493, and equipment at \$727,087,638—a total alone of

\$11,511,537,131. In the general balance sheet for 1905, the statistician gives these two items thus:

	Amount	Increase
Cost of road.....	\$11,170,458,581	\$389,288,643
Cost of equipment.....	780,890,368	46,889,612

An increase of only \$46,889,612 in cost of equipment in a year, when there was a net gain in locomotives of 1,614, in passenger cars of 961, in freight cars of 39,215, and in company's cars of 4,134, costing in the aggregate not less than \$70,000,000, and making no account of the excess cost of new equipment replacing literally thousands of locomotives and cars discarded and destroyed, is patently inadequate. That it does not begin to represent the true cost of the equipment, at least, may be seen from the following conservative estimate of the cost of railway rolling stock, as reported in 1905:

	Number	Estimated Cost	
Locomotives.....	48,357	\$12,000	\$580,284,000
Passenger cars.....	40,713	5,000	203,565,000
Freight cars.....	1,802,158	800	1,441,726,400
Total.....			\$2,225,575,400

The value of this rolling stock is being continually augmented by renewals and additions of locomotives, costing from \$12,000 to \$20,000 each, of passenger and postal cars, costing from \$4,000 to \$12,000 each; and of freight cars costing from \$800 to \$1,200 each. Whether the additional cost of these replacements and additions be charged to capital or income account, or be included in operating expenses, the value goes into the plant of American railways. Once there it is an irrevocable investment and cannot be gotten out, except as it is worn out in income earning service.

IV

RAILWAY CAPITALIZATION IN 1906

Thus far I have dealt only with railway capitalization for 1905, as reported in the official statistics for that year. From the reports of the 313 operating companies to this Bureau, it is possible to arrive at almost as complete information as to their capitalization one year later. According to these the gross capitalization of companies operating 94 per cent of the mileage of the United States in 1906 was \$12,109,380,578, divided as follows:

CAPITALIZATION OF 313 COMPANIES.

(Operating 206,960 miles.)

Capital stock	\$5,642,306,387
Bonds	6,285,526,692
Equipment obligations	181,547,499
	\$12,109,380,578

As only 166,483 miles of the 206,960 miles of line operated by these companies are definitely covered by the capitalization, it becomes necessary to add the capitalized sum of the rental paid for 40,477 miles of leased line, trackage rights, etc. And, in order to arrive at the net capitalization the actual, not the par value, of the stocks and bonds owned by the operating companies should be deducted. This gives us the following summary:

CAPITALIZATION—INCLUDING CAPITALIZED RENTALS AND DEDUCTING
VALUE OF STOCKS AND BONDS OWNED.

Capitalization (as above)		\$12,109,380,578
Capitalized rentals paid for lease of road, trackage, etc., \$116,144,978 at 5%		2,322,899,560
Total		\$14,432,280,138
Less value of		
Stocks owned	\$1,803,801,194	
Bonds owned	631,682,504	*2,435,483,698
Net capitalization		\$11,996,796,440

*NOTE.—The par value of these securities was: stocks, \$2,614,-373,848; bonds, \$784,476,605; total, \$3,399,050,453.

In this net capitalization of \$11,996,796,440, we have an approach to the real capitalization of 94 per cent of the operated mileage of the United States. In value, beyond question over 95 per cent of all the operated railways is included in the above summary. This being so, the net capitalization of all the operating railways that served the public and made rates in 1906 was approximately **\$12,628,000,000.**

This may be considered as the par investment upon which the traffic is required to make the reasonable return recognized by the statutes, the courts and the common good. It represents the following capitalization per mile of road and per mile of track:

Per mile of line (206,960)	\$57,966
Per mile of track (297,720)	40,296

American railways may safely point to these figures, and challenge the world to comparison. Our railways are capitalized per mile at less than one-quarter those of Great Britain and only slightly more than one-half those of the balance of Europe.

V

COST OF CONSTRUCTION, 1906

Despite all that has been said to the contrary, the reverse side of the ledger affords proof, almost amounting to demonstration, that the above net capitalization is well within the sum total of the actual cost of American railways as they stand to-day.

Owing to the vagaries of accounting methods and the financial vicissitudes through which American railways have arrived at their present moderate prosperity—they pay an average of less than 4 per cent on actual capitalization—it is, by no means, an easy matter to gain an accurate idea of what they have cost. It is only a slight exaggeration to say that the American railway without a foreclosure, receivership or reorganization in its history is without a history. In the consequent reorganizations, cost of construction has been very generally merged in cost to present owners; and in the subsequent work of rehabilitation, renewals, improvements and additions, have been divided indifferently among capital, income and operating accounts.

We have already seen how wholly inadequate the official balance sheet for 1905 is in the matter of cost of road and equipment. The returns to this Bureau are scarcely more satisfactory, but, in a measure, they suffice to explain the discrepancy between the official figures on cost of equipment and what is common knowledge of the annual expenditures for rolling stock. Many of the roads find it impossible to separate the items between cost of road and cost of equipment. Bearing these facts in mind, the following statement of the cost of construction, as reported to this Bureau by 313 roads for 1906, may be accepted as forming the basis for arriving at a close approximation of their actual cost to that date:

Cost of road	\$5,986,303,567
Cost of equipment	786,469,647
Cost of both, not separated	3,286,313,826
Total	\$10,039,087,040

A distribution of the third item in the above between the other two in the same proportion as that already made, would give the following readjustment of this cost:

Cost of road	\$8,874,691,398
Cost of equipment	1,164,395,642
Total	\$10,039,087,040

To this must be added the cost of the 6 per cent of railway mileage in the United States not represented in reports to this Bureau, and the cost of road for 40,477 miles of leased line, omitting cost of equipment in this case, as generally provided by the operating road. Estimating the unreported operating roads at a cost of \$30,000 per mile, and the cost of the leased lines at only one-half of their capitalized rent, we would arrive at the following approximation of the cost of construction of all the railways in the United States:

Cost of construction (166,493 miles)	\$10,039,087,040
Cost 13,066 miles at \$30,000	391,980,000
Cost of 40,477 miles leased road, 50% on rental of \$116,144,978 capitalized on 5% basis	1,161,949,780
Total	\$11,593,016,820

Nor does this sum represent the final total of the money irrevocably expended in making the railways what they are—the most effective agencies yet conceived for the transportation of the domestic commerce of a mighty people. Every year since the laying of the first rail on the continent, some part of the cost of betterments and improvements of road and equipment has come out of the income which, in other countries, would have stopped the drain of deficits or gone to swell the profits of investors.

Since the Interstate Commerce Commission began compiling Railway Statistics, an attempt has been made to keep a record of the amounts so diverted from dividends to improving the railway plant. The result is to be found in the summaries of expenditures under the headings "Permanent Improvements Charged to Income Account" and "Other Deductions," which include "funds specially set aside out of income account for permanent improvements." Between 1890 and 1906, inclusive, the aggregate of the items under these two headings amounts to \$867,748,193.

Beyond this impressive sum there is another, which it has been found impossible to segregate from current expenditures. The reports to the Commission require note to be made of "Expenditures during year for cost of road, equipment and permanent improvements *Included in Operating Expenses*," but the returns under this head are so straggling that they have not warranted separation in the summaries. Out of 313 roads reporting to this Bureau, only 43 made a return under this head. Incomplete as they were, these rolled up **the not insignificant total of \$14,593,642 paid in one year for permanent improvements and charged to operating expenses.**

Several roads, including some of the largest systems, explain the

failure to make any return under this head with a statement like the following:

"This company does not treat as a betterment the excess weight of rail laid in renewals; increase in the number of ties per mile of road; increase in size or improvement of quality of road; new side tracks or extensions of old ones, or new shop machinery costing less than \$100; new buildings, permanent bridges and culverts, or improvements to old ones; improvements to rolling stock equipment costing less than \$300."

Bearing in mind that this practice is general throughout the country, and that 43 roads in 1906 reported that \$14,5936,42 expended on betterments was charged to operating expenses, it may be safely estimated that since 1890 an average of \$15,000,000 a year has been similarly expended and charged by all the roads. This enables us to arrive at the following close approximation of the cost of construction of American railways:

COST OF CONSTRUCTION—FINAL SUMMARY INCLUDING COST OF ROAD AND EQUIPMENT, AND PERMANENT IMPROVEMENTS AND SPECIAL FUNDS CHARGED TO INCOME ACCOUNT AND OPERATING EXPENSES:

Cost of construction (as above)	\$11,593,016,820
Permanent improvements charged to income 1890 to 1906 inclusive	301,862,920
Permanent improvements charged to other deductions from income 1890 to 1906, inclusive	565,885,273
Permanent improvements charged to operating expenses 1890 to 1906 (inclusive) 17 years at \$15,000,000	255,000,000
Total cost of construction	\$12,715,765,013
Capitalization (approximated above)	12,628,000,000
Excess of cost over capitalization	\$ 97,765,013

That these totals should so nearly coincide will be a surprise to the majority of readers; but the result has been arrived at by following the simple and independent lines of railway evolution. The excess of cost over capitalization would have been greater had the inquiry been carried back of 1890, when the Commission's figures first became available; or if it had been possible to get at the original cost of the tens of thousands of miles of line that have passed through receiverships and reorganizations during their history.

It should be a welcome and reassuring revelation to the American people to find that their railways, instead of being over-capitalized, as we have been so assiduously taught to believe, are, as a whole, capitalized for less than they cost. One thing, at least, is apparent from the foregoing—that American railways have no reason to fear an honest, unprejudiced and intelligent investigation of their relative cost and capitalization.

Their actual value to-day is far beyond either.

VI

DISTRIBUTION OF RAILWAY STOCK

No later information in regard to the distribution of railway ownership in the United States is accessible than that contained in the report of the Interstate Commerce Commission to the Senate in February, 1905, that the number of stockholders of record at the date of the last election prior to June 30, 1904, of roads reporting to the Commission, was 327,851. This number would have been considerably augmented had the Commission been able to include the stockholders in 922 roads from which no reports bearing on this subject were received.

Of the 313 roads reporting to this Bureau last year, 284 reported the number of stockholders of record at the date of the last election prior to June 30, 1906, was 226,986. Compared with the number of record for the same roads in 1904, this shows a decrease of 5,667.

Incomplete as these figures as to the number of stockholders are, and silent as they are as to the number of bondholders, they are sufficient to indicate how widely distributed is railway ownership in the United States.

VII

PUBLIC SERVICE OF RAILWAYS

There can be no better means of demonstrating how the railroads are performing the essential office of transporting the passenger and freight traffic of a growing nation, than by a comparison of the traffic and the terms on which it was handled during the past two years. In the following statement the record for 94% of the railways operated in 1906 is compared with the final official returns for 1905:

PASSENGER SERVICE.

ITEM	1906	1905
Miles of line represented.....	206,960	216,973
Passengers carried.....	751,996,659	738,834,667
Passengers carried 1 mile.....	24,619,575,000	23,800,149,436
Passenger revenue.....	\$494,955,235	\$472,694,732
Average journey per passenger (miles).....	32.74	32.21
Average receipts per passenger (cents).....	2.010	1.962
Mileage of revenue passenger trains.....	463,003,294	459,287,029
Average number of passengers on train.....	53	48

FREIGHT SERVICE.

ITEM	1906	1905
Number of tons carried.....	1,440,735,419	1,427,731,905
Tons carried one mile.....	213,829,685,000	186,463,109,510
Freight revenue.....	\$1,584,653,399	\$1,450,772,838
Average haul per ton (miles).....	148.42	130.60
Average receipts per ton per mile (mills).....	7.46	7.66
Mileage of freight trains.....	578,239,776	546,424,405
Average number of tons in train.....	369.85	322.26
Mileage of mixed trains.....	27,060,880	32,189,996
Total revenue train mileage.....	1,068,303,950	1,038,441,430
Ratio of operating expenses to earnings.....	65.97	66.78

In every item of service rendered it will be observed that 94 per cent of the railways in 1906 showed an advance over that rendered by all the railways in 1905. This is especially noteworthy in the total tons of freight carried one mile—the most significant measure

of American railway service. Here the excess of the part in 1906 over the whole in the preceding year—itself the greatest on record—is no less than 27,366,575,490 ton miles, or nearly fifteen per cent. This indicates an increase of about 18 per cent on the final returns.

Analyzed in the light of the differences between the report of this Bureau last year and the final report, the completed figures for 1906 will probably show an average passenger journey of under 32 miles; average passenger receipts per mile scarcely varying one hundredth part of a cent; an average of 50 passengers per train; an average freight haul of 132 miles; an average of 345 tons per train, and an average of 7.50 mills receipts per ton mile. The variations from the above table are likely to be less this year than last, because the reports to this Bureau are 3 per cent more complete this year than in 1905. If the estimated receipts per passenger and ton mile prove correct, it will demonstrate that both are less than they were ten years ago, and almost exactly the same as they were in 1901, as appears from the following summary, covering seventeen years, which, for convenience, includes the ratio of operating expenses to earnings during the same period:

AVERAGE PASSENGER AND FREIGHT RECEIPTS SINCE 1890, TO-
GETHER WITH THE WORKING RATIO.

	Passenger receipts per Mile (Cents)	Freight receipts per Ton Mile (Mills)	Per Cent Expenses to Earnings
1906.....	2.010	7.50	66.05
1905.....	1.962	7.66	66.78
1904.....	2.006	7.80	67.79
1903.....	2.006	7.63	66.16
1902.....	1.986	7.57	64.66
1901.....	2.013	7.50	64.86
1900.....	2.003	7.29	64.65
1899.....	1.978	7.24	65.24
1898.....	1.973	7.53	65.58
1897.....	2.022	7.98	67.06
1896.....	2.019	8.06	67.20
1895.....	2.040	8.39	67.48
1894.....	1.986	8.60	68.14
1893.....	2.108	8.79	67.82
1892.....	2.126	8.98	66.67
1891.....	2.142	8.95	66.73
1890.....	2.167	9.41	65.80

With this table in one hand and a price list of the cost of every description of labor and material entering into their maintenance and operation in the other, the railways of America have an exhibit

of what economies of organization and management can do in the face of most untoward conditions.

In passing, it may be remarked that the average receipts per ton mile in 1906 were only one-fourth of a mill above the lowest point ever reached by this significant unit.

On pages 58 and 59 of this pamphlet the reader will find a condensed summary of the operation of European railways, compiled from the latest accessible sources of information, with which it may be instructive to make comparisons as to results.

VIII

EARNINGS AND EXPENSES

Having now set forth the physical and financial conditions under which railways in the United States are maintained and operated, and the extent of their service to the public, it remains to consider what return they receive for that service, and how the income derived therefrom is distributed. This is the part of railway statistics that has the first call on Wall Street, and is the only part the official statistician covers, to a limited extent, in his preliminary report. Unfortunately that report, to which reference is made in the introduction, includes intercorporate payments and other duplications.

In the following summary the returns to this Bureau for 1906 are placed in juxtaposition with what the statistician says "may be accepted as an income account of the railways of the United States considered as a system" for 1905. Here, again, it should be remembered that the returns for 1906 cover only 206,960 miles of operated roads, while those for 1905 cover the final mileage of 216,973 miles.

**COMPARATIVE INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED STATES,
CONSIDERED AS A SYSTEM, FOR THE YEAR ENDING
JUNE 30, 1905 AND 1906.**

Earnings from Operation	1905		1906	
Passenger revenue.....	\$472,694,732		\$494,955,235	
Mail.....	45,426,125			
Express.....	45,149,155			
Other passenger earnings.....	11,040,142			
Freight revenue.....	1,450,772,838		1,584,652,399	
Other freight earnings.....	5,080,266			
Unclassified.....	52,319,148		(a) 166,813,532	
Total.....		\$2,082,482,406		\$2,246,421,166
Operating expenses.....	\$1,390,602,152			\$1,482,148,334
Salaries and maintenance leased track.....	612,518			
Total.....		\$1,391,214,670		
Net earnings from operation.....		691,267,736		764,272,832
Income from other sources.....		(b) 51,725,750		140,158,736
Net earnings and income.....		\$742,993,486		\$904,431,568
Interest on funded debt.....	294,803,884		252,572,777	
Interest on current liabilities.....	11,451,400		13,819,287	
Rent paid for lease of road (see note c.).....			116,144,978	
Taxes.....	63,474,679		67,356,217	
Permanent improvements charged to income account (see note d.).....			56,502,413	
Interest on real estate mortg's.....			422,322	
Other deductions (see note e.).....			59,610,904	
Total.....		369,729,963		566,428,895
Available for dividends, ad- justments and improvement.....		\$373,263,523		338,002,670
Dividends.....		188,175,151		221,507,203
Common.....			175,334,923	
Preferred.....			46,005,909	
Other payments.....			166,371	
Available for adjustments and improvements (see note f.).....		185,088,372		116,495,467
To cover deficits in operation of 76 unprofitable roads (see note f.).....				12,292,750

(a) The returns to this Bureau do not separate the earnings from mail, express, etc. This total of \$166,813,532 in 1906 should be compared with \$159,014,836, the sum of mail, express, other passenger, freight and unclassified receipts for 1905.

(b) This figure in the official statistics for 1905 represents only "clear income from investments." The gross "income from other sources" that year was \$231,898,553, swelling the total earnings and income to \$2,314,380,959, which in the language of the statistician is "a wholly fictitious figure." Why it is persistently given is one of the mysteries of the official statistics.

(c) The amounts paid by operating companies in 1905 under the head of "Rent paid for lease of road" was \$116,380,644.

(d) "Permanent improvements charged to income account" in 1905 by operating companies amounted to \$32,774,318.

(e) "Other deductions" by operating companies in 1905 amounted to \$46,512,568.

(f) The official distribution of this item in 1905 reads: "This amount comprises the following items: Permanent improvements, \$37,720,624; advances to cover deficits in operation of weak lines (estimated) \$5,000,000; miscellaneous deductions, \$53,324,258; surplus, \$89,043,490." Why the amount required to make up deficit of weak lines should be estimated at \$5,000,000 in 1905 when the returns to the Commission for 94 per cent of the operating roads in 1906 shows a deficit of \$12,292,750 is unexplained.

By comparing the figures in the above table for 1906 with those given from the preliminary report of the Commission mentioned in the Introduction, it will be found that the gross earnings of the 206,960 miles represented in this report are within \$73,338,964 of the Commission's figures, for 220,026 miles, and the difference in operating expenses is only \$50,014,817. This establishes the fact that 96% of the railways is covered by the returns to this Bureau.

The ratio of operating expenses to earnings in 1906, according to the above table, was 65.97%, as compared with 66.05% in the Commission's preliminary report for the same year, and 66.78% in the final report for 1905. The final report for 1906, when issued next winter, will probably show an operating ratio of about 66.5%, as late returns are invariably from roads whose expenses are high in proportion to their earnings.

The three items, interest on funded debt, rents paid for lease of road, and dividends, taken in connection with "Income from other sources," enables the reader to comprehend, if he wants to, how much or how little is drawn out of earnings from operation on account of capital. The situation may be tabulated thus:

Interest on funded debt.....	\$252,572,777
Interest on current liabilities.....	13,819,287
Rents paid for lease of road.....	116,144,978
Dividends.....	221,507,203
Total paid account of capital.....	\$604,044,245
Less income from other sources, including interest and dividends on bonds and stocks owned.....	140,158,736
Net capital charge.....	\$463,885,509

This is equivalent to 3.86% on the net capitalization of the roads included in this report, as given on page 21, and is absolutely all that comes out of the fares and rates paid by passengers and freight.

In his testimony before the Senate Committee, Governor Cummins of Iowa, said that "a margin of play between a reasonable rate and a confiscatory rate would be one that afforded a return on capital invested of between 7% and 3%." He said further that the lower rate was "so much below the fair return that I would look upon 3 per cent as a confiscatory rate."

IX

DISTRIBUTION OF GROSS EARNINGS IN 1905

One of the most interesting features of railway statistics is the distribution of their gross earnings. Public attention is seldom directed to this, because, for reasons not necessary to discuss, that attention is almost exclusively occupied with the contemplation of the gross income and dividends.

In 1905 the gross earnings of the railways in the United States according to the official statistician, were \$2,082,482,406. Except as to the items under "Material," which had to be approximated from the returns that included labor, the same authority distributed the gross earnings as follows:

ITEM	Amount	Per Cent 1905	Per Cent 1904
Pay of employes.....	\$839,944,660	40.34	41.40
Fuel for locomotives.....	156,429,245	7.51	8.05
Water, oil and supplies for locomotives.....	17,885,944	.86	.44
Taxes.....	63,474,679	3.05	3.17
Permanent improvements.....	37,720,624	1.81	1.95
Miscellaneous deductions (improvements).....	53,324,258	2.56	2.20
Deficits in operating weak lines.....	5,000,000	.24	.25
Material for			
Locomotives, renewals and repairs.....	50,000,000	2.40	2.27
Freight car renewals and repairs.....	51,000,000	2.45	2.22
Passenger car renewals and repairs.....	16,000,000	.77	.71
Bridges.....	17,000,000	.82	.91
Rails.....	14,000,000	.63	.60
Ties.....	25,000,000	1.20	1.16
Ballast and repairs to roadway.....	22,000,000	1.06	1.01
Buildings.....	16,000,000	.77	.76
Hire of equipment, car service, etc.....	21,875,966	1.05	1.32
Rent for tracks, yards and terminals.....	23,947,881	1.15	.99
Rents of buildings and other property.....	4,814,407	.23	.25
Train and station supplies.....	30,924,659	1.49	1.57
Shop tools, repairs, renewals.....	9,186,101	.44	.48
Loss and damage.....	19,782,692	.95	.87
Payments for injuries to persons.....	16,034,727	.77	.80
Law expenses.....	7,096,275	.34	.35
Stationery and printing.....	12,191,299	.59	.59
Advertising.....	5,959,380	.24	.30
Outside agencies.....	19,688,261	.95	.....
Insurance.....	6,885,932	.33	.....
Miscellaneous expenses.....	19,433,609	.93	.96
Interest on bonds and current liabilities.....	305,255,284	14.67	14.99
Dividends.....	188,175,151	9.04	9.30
Surplus earnings.....	6,451,352	.31	.13
Total.....	\$2,082,482,406	100.00	100.00

The apparently insignificant surplus shown in this table should not be compared with the "surplus from operations" which the statistician works out in his annual report for 1905, and is only made possible by including in the "operations" \$231,898,553 "income from other sources" than operating railways. It was the inclusion of a similar item in 1904 that swelled the "total earnings and income" for that year to what the statistician himself pronounced "a fictitious figure."

DISTRIBUTION IN 1906.

Unfortunately, the returns to this Bureau do not cover all the items in the foregoing table. So far as they do, however, they afford a basis for the following interesting comparative statement:

ITEM	Amount	Per Cent 1906	Per Cent 1905
Pay of employes.....	\$900,828,208	40.10	40.34
Taxes.....	67,356,217	3.00	3.05
Permanent improvements.....	56,502,413	2.52	1.81
Miscellaneous deductions (improvements).....	59,610,904	2.65	2.56
Deficits in operating weak lines.....	12,292,750	.54	.25
Interest on bonds and current liabilities.....	266,392,064	11.86	14.67
Dividends.....	221,507,203	9.86	9.04
	\$1,584,489,759	70.53	71.72

This table indicates that not only capital but labor received a smaller proportionate share of the gross earnings of the railways in 1906 than in 1905. It would amount to proof, but for the fact that the figures for 1905 are swelled by payments made by non-operating companies out of sums received by them from operating companies:

X

TAXES

In the last preceding table the taxes of the 313 companies reporting to this Bureau is given as \$67,356,217. This, it should be understood, is exclusive of the amount paid annually by the operated companies directly out of rentals received by them. How this unavoidable "fixed charge" has more than doubled during the past fifteen years is shown in the following statement:

Year	Taxes Paid	Taxes per Mile
1906—Operating roads only.....	\$67,356,217	325
1905—Including operated roads.....	63,474,679	292
1904—Including operated roads.....	61,696,354	290
1903—Including operated roads.....	57,849,569	291
1902—Including operated roads.....	54,465,437	272
1901—Including operated roads.....	50,944,372	280
1900—Including operated roads.....	48,332,273	250
1899—Including operated roads.....	46,337,632	247
1898—Including operated roads.....	43,828,224	237
1897—Including operated roads.....	43,137,844	235
1896—Including operated roads.....	39,970,791	219
1895—Including operated roads.....	39,832,433	224
1894—Including operated roads.....	38,125,274	216
1893—Including operated roads.....	36,514,689	215
1892—Including operated roads.....	34,053,495	209
1891—Including operated roads.....	33,280,095	206

This is an illuminating statement for those seeking light on the railway situation. At a glance it shows that whether times be good or bad; hard or easy, the tax collector has never failed to knock at the railway till for an ever increasing toll.

Not only have railway taxes more than doubled during these fifteen years absolutely, but the right hand column proves that in the meantime they have increased more than 57 per cent per mile of road.

During the fifteen years, from 1890 to 1905, the total railway capital, as given by the official statistician, has only increased from \$9,437,343,420 to \$13,805,258,121, or 46 per cent, and their capital per mile, according to the same authority, has risen from \$60,340 to \$65,926, or only 9.25 per cent.

The disparity between the increase in capital and in taxes, absolutely and per mile respectively ought to afford believers in the "square deal" food for thought, especially in connection with the steady decline in receipts per ton mile.

XI

FREIGHT MOVEMENT BY COMMODITIES

In recent reports, the official statistician has been careful to warn the public against placing too much reliance on the rate per ton mile as the true measure of increase or decrease in the railway rates. In 1904 he wrote:

“It must be remembered, in this connection, that changes in the rate per ton mile may depend quite as much upon the changes in the character of the freight and in the conditions under which freight is carried as upon a change in the tariff rate.”

Again, in 1905, in discussing the summary of results which showed that the ton mile rate had declined during the year, he reiterated his warning in these words:

“Attention has frequently been called to the fact that the average per ton per mile covers all kinds and classes of freight, and may be quite as much influenced by a change in the relative quantity of the different classes of freight as by any change in the rate itself.”

With this proper warning in mind, the following comparative statement of the proportion of the several classes into which freight is divided by the Commission for the years 1905 and 1904 with 1899, the year when the rate per ton reached its lowest point, will be of interest:

LOW RATE COMMODITIES.

CLASSES	Per Cent of 1905	Aggregate Tonnage	
		1904	1899
Products of agriculture.....	9.03	9.59	11.33
Products of animals.....	2.54	2.74	3.12
Products of mines.....	53.59	51.56	51.47
Products of forests.....	11.24	12.53	10.89
Total.....	76.40	76.42	76.81

HIGHER RATE COMMODITIES.

Manufactures.....	13.60	13.41	13.45
Merchandise.....	4.32	4.83	4.49
Miscellaneous.....	5.68	5.34	5.25
Total.....	23.60	23.58	23.19
All commodities.....	100.00	100.00	100.00

The significance of this table is that the percentage of higher rate commodities in 1905 was sufficiently greater than in 1899 to more than account for the ton mile rate, being two-fifths of a mill higher, without any change whatever in the rate itself. The shifting percentages between 1905 and 1904 are such as would result in a slight decrease in the ton mile receipts, while the changes between 1905 and 1899 show a decided increase in "miscellaneous" freight during the former year, which would tend to increase the ton mile receipts.

XII

RAILWAY EMPLOYES

In 1906 the army of railway employees mustered more than a million and a half men to divide a pay roll of over \$900,000,000—the best paid and most efficient army of employees in the world. Upon the intelligence, industry and discipline of this vast army depends the ability of our transportation system to meet the progressive demands of American commerce and industry.

The first summary under this title gives the number of employees in each class on the pay roll of the 313 operating railways reporting to this Bureau on June 30, 1906, in comparison with the final figures on the same date in 1905, as follows:

COMPARATIVE SUMMARY OF EMPLOYES BY CLASS FOR THE YEARS 1906 AND 1905.

CLASS	Number 1906	Number 1905
General officers.....	3,473	5,536
Other officers.....	6,160	5,706
General office clerks.....	54,800	51,284
Station agents.....	32,592	35,245
Other station men.....	133,745	125,180
Enginemen.....	56,696	54,817
Firemen.....	59,643	57,892
Conductors.....	41,684	41,061
Other trainmen.....	113,389	111,405
Machinists.....	49,517	47,018
Carpenters.....	61,432	56,089
Other shopmen.....	194,523	176,348
Section foremen.....	38,199	38,217
Other trackmen.....	327,467	311,185
Switch tenders, crossing tenders and watchmen.....	47,139	45,532
Telegraph operators and dispatchers.....	34,592	31,963
Employees—account floating equipment.....	9,162	8,753
All other employees and laborers.....	192,172	178,965
One road not distributed.....	4,391	.....
Total.....	1,460,778	1,382,196
Per 100 miles of line.....	707	637

The total of 1,460,778 employees on 206,960 miles of line in 1906 indicates that the final report for that year will show a total approximating 1,550,000.

The disproportionately small number of general officers in the column for 1906 is due to the fact that only 313 operating companies reported to this Bureau, whereas the final report to the Commission in 1905 included 907 independent operating companies, and a total of 2,167 of all kinds—operating, subsidiary, etc.—all equipped with general officers, if with nothing else. This inclusion multiplies the class of general officers out of all proportion to the number of miles operated, or other classes employed.

The density of railway employment, as shown by there being 707 employes per mile of line, is the greatest recorded. The highest previous record was 639, on June 30, 1903.

The increase in the number of railway employes during the last decade is shown in the following statement:

Year	Number	Year	Number
1906 (est).....	1,550,000	1900.....	1,017,653
1905.....	1,382,196	1899.....	928,924
1904.....	1,296,121	1898.....	874,558
1903.....	1,312,537	1897.....	823,476
1902.....	1,189,315	1896.....	826,620
1901.....	1,071,169		

This shows an increase in the number of employes of 87.5 per cent in ten years.

COMPENSATION OF EMPLOYES.

As shown in a previous summary, the compensation of railway employes in 1906, amounting to \$900,828,208, absorbed 40.10 per cent of the gross earnings of the railways reporting to this Bureau. How that compensation was distributed among the classes above named in comparison with the years 1905 and 1896 is shown in the following statement:

**SUMMARY SHOWING AMOUNT OF COMPENSATION PAID RAILWAY
EMPLOYEES FOR THE YEARS ENDING JUNE 30,
1906, 1905 AND 1896.**

CLASS	1906 Compensation	Per Cent	1905 Compensation	1896 Compensation
General officers.....	\$14,413,744	1.60	\$15,155,278	\$12,497,957
Other officers.....	12,250,472	1.36	11,599,169	5,301,119
General office clerks.....	40,970,601	4.54	37,445,570	19,037,816
Station agents.....	21,960,490	2.43	23,112,137	17,050,117
Other station men.....	70,523,617	7.82	67,012,465	39,076,478
Enginemen.....	73,733,704	8.18	70,628,750	41,354,307
Firemen.....	43,878,207	4.87	41,701,463	23,724,854
Conductors.....	46,931,534	5.29	44,758,533	24,758,465
Other trainmen.....	80,536,218	8.94	77,416,200	38,379,035
Machinists.....	40,351,224	4.47	37,495,267	19,312,746
Carpenters.....	41,186,791	4.57	36,501,025	22,948,585
Other shopmen.....	114,447,920	12.70	101,164,035	48,497,887
Section foreman.....	22,959,487	2.54	23,041,754	17,097,832
Other trackmen.....	111,279,118	12.35	103,413,280	54,521,113
Switch tenders, crossing tenders and watchmen.....	27,256,939	3.02	26,355,957	24,950,907
Telegraph operators and dispatchers..	24,925,884	2.76	22,638,034	13,695,587
Employees—account floating equip- ment.....	5,845,640	.65	5,612,076	3,221,290
All other employees and laborers.....	104,743,289	11.62	94,895,687	43,398,416
One road not distributed.....	2,633,329	.29	.....	.....
Total.....	\$900,823,208	100.00	\$839,944,680	\$468,924,531

As it is safe to estimate the compensation of the employees of the roads not reporting in 1906 at \$40,000,000, this statement shows that during the decade the aggregate compensation of railway employees in the United States has increased over 100 per cent. Another interesting fact disclosed by this table is that the compensation of general officers, which represented 2.68 per cent of the total pay roll in 1896, remained so comparatively stationary during the decade that in 1906 it was only 1.63 per cent of the whole.

AVERAGE DAILY PAY.

The next summary gives the average daily compensation of the various classes of railway employees for the years mentioned. As explained by the official statistician, these averages do not, in all cases, show with absolute accuracy the daily earnings of railway employees; because, as in the case of engineers, firemen, conductors and other trainmen, their work is not always measured by the day. They do show, however, what employees receive on an average per day's work when all is reduced to a daily average, and form a competent basis for comparison:

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF
RAILWAY EMPLOYEES FOR THE YEARS ENDING JUNE 30,
1906, 1905, 1904 AND 1896.

CLASS	1906	1905	1904	1896
General officers.....	\$14.27	\$11.74	\$11.61	\$ 9.19
Other officers.....	5.93	6.02	6.07	5.96
General office clerks.....	2.25	2.24	2.22	2.21
Station agents.....	1.98	1.93	1.93	1.73
Other station men.....	1.80	1.71	1.69	1.62
Enginemen.....	4.18	4.12	4.10	3.65
Firemen.....	2.45	2.38	2.35	2.06
Conductors.....	3.55	3.50	3.50	3.05
Other trainmen.....	2.37	2.31	2.27	1.90
Machinists.....	2.72	2.65	2.61	2.26
Carpenters.....	2.36	2.25	2.26	2.03
Other shopmen.....	1.94	1.92	1.91	1.69
Section foremen.....	1.82	1.79	1.78	1.70
Other trackmen.....	1.37	1.32	1.33	1.17
Switch tenders, crossing tenders and watchmen.....	1.80	1.79	1.77	1.74
Telegraph operators and dispatchers.....	2.17	2.19	2.15	1.93
Employees—account floating equipment.....	2.13	2.17	2.11	1.94
All other employes and laborers.....	1.85	1.83	1.82	1.65
All employes.....	\$2.09	No information		.

The averages on some of the classes in 1906 are higher than the final returns will show, because the returns to this Bureau include all the larger systems. But the average pay varies much more in different territories than on different railways in the same section of the country. For instance, the average compensation of enginemen on the Pacific Coast in 1905 was \$5.02 per day, while that in New England was \$3.60 per day.

Regarding the daily average compensation of "All employes," as to which no information is printed by the official statistician, returns to this Bureau in 1905 yielded an average of \$2.07 per day against \$2.09 in 1906. The difference reflects the general trend.

Definitive comparisons may be made between the official figures for 1905 and 1896, which show that in the more important classes of railway employment there has been a positive increase of from 12 to 21 per cent.

XIII

SOME COMPARATIVE RESULTS

Collating some of the more significant facts, as given in the preceding pages, it appears that, during the decade ending June 30, 1906, the following remarkable progress has been made by the railways of the United States:

ITEM	1906	1896	Increase Per Cent
Miles of line.....	220,026	181,982	20.9
Miles of track.....	315,000	239,140	31.7
Locomotives—number.....	51,357	35,950	42.8
Locomotives—weight (tons).....	3,286,848	1,797,500	82.8
Freight cars—number.....	1,851,409	1,221,887	51.5
Freight cars—capacity (tons).....	58,455,088	29,936,231	95.3
Block system (miles).....	53,133	No data (a)	.....
Cars with automatic couplers.....	1,871,590 b	545,583	243.1
Cars with train brake.....	1,641,395 b	448,854	265.6
Capitalization (gross).....	\$13,805,258,121 b	\$10,566,865,771	30.6
Passengers carried 1 mile.....	24,619,575,000	13,049,007,233	88.6
Tons of freight carried 1 mile.....	213,829,685,000	95,328,360,278	124.3
Gross earnings.....	2,319,760,030	1,150,169,376	101.7
Expense of operation.....	1,532,163,153	772,989,044	98.2
Ratio of expenses to earnings.....	66.05	67.20	d 1.7
Number of employes.....	1,460,778	826,620	76.7
Wages of employes.....	900,828,208	468,824,531	94.3
Interest and dividends.....	487,899,267	286,154,412	70.5
Taxes.....	68,903,288	39,970,791	72.4
Receipts per passenger mile (cents).....	2.01	2.019	d 0.4
Receipts per ton mile (mills).....	7.50	8.06	d 6.9

(a) In 1891 the official statistician stated, "At present a very small proportion of the railway system of the United States is operated on the block system."

(b) 1905.

(d) Decrease.

The pregnant evidences of railway expansion and progress shown in the column of percentages of *increase* are emphasized and rendered more remarkable by the two items of decrease at the foot of the column on which, so to speak, it rests.

Insignificant as the decrease in the receipts per passenger mile appears, applied to the traffic manager of 1906, it would have increased the passenger revenues of the railways \$2,215,761, and if the comparatively low ton mile rate of 1896 had been in force in 1906 the freight revenues of the railways of the United States the latter year would have been increased by fully \$120,000,000.

Next to the decrease in the ton mile rate, the comparatively small increase in the gross capitalization in nine years is the most noteworthy feature of this summary. Viewed in the light of the cumulative expenditures on miles of line, miles of track, locomotive and car tonnage, block system and other safety appliances—all summed up in the capacity to handle an increase in passenger and ton mileage of 88 and 124 per cent, respectively, the increase of only 30.6 per cent in capitalization is unparalleled in the history of railway expansion.

XIV

RAILWAY ACCIDENTS

According to Accident Bulletin No. 20 of the Interstate Commerce Commission, the number of passengers and employees killed and injured on the railways of the United States during the year ending June 30, 1906, was as follows:

CLASS OF ACCIDENT	Passengers (a)		Employees	
	Killed	Injured	Killed	Injured
Collisions.....	120	4,005	484	3,909
Derailements.....	60	2,656	313	2,116
Miscellaneous train accidents, including boiler explosions.....	2	117	82	1,458
Total train accidents.....	182	6,778	879	7,483
Coupling or uncoupling.....			311	3,503
While doing other work about trains or while attending switches.....			268	15,854
Coming in contact with overhead bridges, structures at side of track, etc.....	8	46	132	1,497
Falling from cars or engines or while getting on or off.....	144	2,027	713	11,253
Other causes.....	84	2,334	1,504	15,934
Total (other than train accidents)....	236	4,407	2,928	48,041
Total (all classes).....	418	11,185	3,807	55,524

(a) Including postal clerks and express messengers, employees on Pullman cars, newsboys, live-stock tenders and men in charge of freight accounting for 68 killed and 1,052 injured.

If these casualties were divided, as they should be, between those due to "causes beyond their own control" and "due to their own action or negligence," as they are in Australia, it would be found that the railways were actually responsible for only 43.5 per cent of the passengers killed and 60 per cent injured, and for 23.1 per cent of the employees killed and only 13.5 per cent of the injured.

If the table is examined still more closely, it will be perceived that a majority of the fatalities to passengers and nearly two-thirds of those to employees are due to causes unconnected with the movement of trains. What is more, the class of accidents which the most efficient block signal system is designed to prevent, viz., collisions, constitute only 29 per cent of the fatalities to passengers and 13 per cent of those to employees.

According to returns to this Bureau, the number of persons,

other than passengers and employes, killed and injured in railway accidents during the year 1906, was as follows:

CLASS	Killed	Injured
Trespassers	5,138	5,820
Not trespassing	797	2,711
Total other persons.....	5,935	8,531

From which it appears that at least 82 per cent of all the fatalities to passengers, employes and "other persons" in railway accidents in the United States in 1906 were "due to their own action or negligence."

Combining these returns of "other persons" with those supplied by Accident Bulletin No. 20 completes the totals for 1906, as given in the following summary of railway fatalities since the Commission began keeping statistics of accidents.

KILLED IN RAILWAY ACCIDENTS.

YEAR	Passengers	Employes	Other Persons	Total
1906.....	418	3,807	5,935	10,160
1905.....	537	3,361	5,805	9,703
1904.....	441	3,632	5,973	10,046
1903.....	355	3,606	5,879	9,840
1902.....	345	2,969	5,274	8,588
1901.....	282	2,675	5,498	8,455
1900.....	249	2,550	5,006	7,865
1899.....	239	2,210	4,674	7,123
1898.....	221	1,958	4,680	6,859
1897.....	222	1,693	4,522	6,437
1896.....	181	1,861	4,406	6,448
1895.....	170	1,811	4,155	6,136
1894.....	324	1,823	4,300	6,447
1893.....	299	2,727	4,320	7,346
1892.....	376	2,554	4,217	7,147
1891.....	293	2,660	4,076	7,029
1890.....	286	2,451	3,598	6,335
1889.....	310	1,972	3,541	5,823
1888.....	315	2,070	2,897	5,282

This table affords proof that, although railway accidents by their harrowing frequency continue to excite popular demand for some remedial legislation, and call for the adoption of more effective safeguards, they have not increased relatively to the enormous increase in traffic.

Comparing the year 1892 with 1906—years when traffic conditions were similarly active—it appears that there was an increase of only 11.2 per cent in fatalities to passengers, against an increase

of over 85 per cent in passengers carried one mile; there was an increase of 45.1 per cent in fatalities to employees, against an increase of 131 per cent in tons of freight carried one mile and of 87.4 per cent in the number of employees; and in the total killed in all kinds of accidents there was an increase of 42 per cent, against an increase of traffic and in the number of employees averaging over 100 per cent.

Comparisons with the years 1895 and 1896 in regard to accidents are valueless, because of the business depression in those years, which relieved the strain on transportation facilities and enabled the railways to employ more efficient and experienced men. Even with such a difference in conditions, the percentage of increase in all railway fatalities between 1896 and 1906 was 58 per cent, against an increase of 88.6 per cent in passenger traffic, of 124.3 in freight traffic, and of 87.5 in the number of employees.

The true relation of railway accidents to passenger travel in the United States is most nearly disclosed in the following table of the number of passengers carried one mile for one killed in a train accident during the period for which statistics are available:

PASSENGERS CARRIED ONE MILE FOR ONE KILLED.

YEAR	Passengers Killed in Train Accidents	Passengers Carried One Mile	Passengers Carried One Mile for One Killed
1906.....	182 (a)	24,619,575,000	135,272,390
1905.....	350	23,800,149,436	68,000,427
1904.....	270	21,923,213,536	81,197,087
1903.....	164	20,915,763,881	127,535,745
1902.....	170	19,689,937,620	115,823,162
1901.....	110	17,353,588,444	157,759,894
1900.....	93	16,038,076,200	172,463,183
1899.....	83	14,591,327,613	175,799,127
1898.....	74	13,379,930,004	180,809,864
1897.....	96	12,256,939,647	127,676,454
1896.....	41	13,049,007,233	318,268,469
1895.....	30	12,188,446,271	406,281,542
1894.....	162	14,289,445,893	88,206,456
1893.....	100	14,229,101,084	142,291,010
1892.....	195	13,362,898,299	68,522,555
1891.....	110	12,844,243,881	116,765,853
1890.....	113	11,847,785,617	104,847,660
1889.....	161	11,553,820,445	71,762,859

(a) Of these only 137 were passengers in the ordinary sense of the term.

For the benefit of those who delight in instituting disparaging comparisons between the safety of travel on American and foreign railways, the following statement of the proportion killed to number carried on British railways since records have been kept, taken from the latest report to the British Board of Trade, are here appended:

PROPORTION OF KILLED TO NUMBER CARRIED ON BRITISH RAILWAYS SINCE 1874, EXCLUSIVE OF SEASON TICKET HOLDERS.

YEAR	Killed to Passengers Carried	YEAR	Killed to Passengers Carried
1874.....	1 in 5,556,294	1890.....	1 in 45,430,224
1875.....	1 in 29,882,073	1891.....	1 in 169,092,733
1876.....	1 in 14,165,455	1892.....	1 in 41,163,589
1877.....	1 in 50,144,876	1893.....	1 in 51,363,356
1878.....	1 in 23,542,685	1894.....	1 in 56,963,307
1879.....	1 in 7,503,105	1895.....	1 in 185,954,182
1880.....	1 in 20,823,586	1896.....	1 in 196,067,867
1881.....	1 in 27,050,435	1897.....	1 in 57,245,567
1882.....	1 in 36,379,905	1898.....	1 in 42,516,445
1883.....	1 in 62,156,194	1899.....	1 in 79,049,428
1884.....	1 in 22,419,092	1900.....	1 in 71,392,293
1885.....	1 in 116,202,171	1901.....	1 in
1886.....	1 in 90,698,049	1902.....	1 in 198,036,545
1887.....	1 in 29,346,800	1903.....	1 in 47,810,608
1888.....	1 in 67,530,000	1904.....	1 in 199,758,000
1889.....	1 in 8,808,875	1905.....	1 in 30,744,156

If the reader will multiply the passengers carried by 10.3 to cover the average journey, 7.8 miles, and the season-ticket passengers, these figures may be compared with those on American railways with an approximation to a common basis, so far as passenger traffic is concerned.

No two tables could be prepared to more clearly demonstrate the absolutely accidental and widely fluctuating nature of railway accidents than those just given. The entire immunity from passenger fatalities in train accidents in the United Kingdom in 1901 was just as much of an accident as the death of 80 passengers in a single collision near Armagh, which darkened the record in 1889. In the former year there were 51 collisions between passenger trains, 55 collisions of passenger trains with freight trains, 29 collisions of trains and buffer stops, and 65 cases of passenger trains leaving the rails. In these various accidents there were no less than 476 passengers injured, but not one killed. In the year 1905 there were 39 passengers killed and 396 injured in a less number of accidents to passenger trains.

Reverting to the table of passengers carried on American railways to one killed in train accidents, it should be noted that the unenviable preeminence for the greatest proportionate fatality lies between 1892 and 1905, while the year of the greatest immunity, 1895, succeeds one of the worst years in the list.

It should also be noted that this last occurred during the period of depression, when railway accidents are less likely to happen.

But this exception to the rule was explained by the official statistician, who, in commenting on it, said: "As will be remembered by one who recalls the current events of the year covered by this report, the increase in the number of passengers killed is due to a few unusually serious accidents in connection with excursion traffic."

When comment comes to be made on the current year, the statistician will have to substitute "where block signals were ignored" for the five concluding words of his comment of 1894

Some idea of the predominance of our freight traffic as a cause of railway accidents may be obtained from an analysis of the 91 "prominent" collisions reported in the Commission's Accident Bulletins for the four quarters ending June 30, 1906, where they are classified as follows:

CLASS OF TRAIN IN COLLISION	Number of Collisions	Killed	Injured
Passenger and passenger.....	20	94	621
Passenger and freight.....	34	71	580
Freight and freight.....	37	42	86
Total.....	91	207	1,287

It will be observed that the collisions between passenger and freight trains were far more numerous than those between passenger trains, while the mortality was 75 per cent as great. There were more collisions between freight trains than in either of the other classes.

In addition to the loss of life in these 91 collisions, the damage to engines, cars and roadway amounted to \$967,998

No less than 18 of these 91 prominent collisions were due to failure or disregard of block signals.

The monetary interest the railways have in reducing accidents to a minimum is shown in the following statement of payments chiefly due to them in the year 1905:

Loss and damage.....	\$19,782,692
Injuries to persons.....	16,034,727
Clearing wrecks.....	3,594,658
Total.....	\$39,412,077

If the railway managers were wholly devoid of human sensibilities, here would be sufficient inducement for the adoption of every possible precaution against accidents.

RAILWAY ACCIDENTS IN EUROPE.

While comparison cannot relieve American railways from any duty to provide all possible safeguards for their vast industry, the record of fatalities on European roads indicates that we have no monopoly of railway casualties, as some of our publicists would have us believe. Omitting the injured, because there is no common standard as to what constitutes a reportable injury, the figures of railway fatalities in Europe from the latest official sources are as follows:

KILLED IN RAILWAY ACCIDENTS.

COUNTRY	Passengers	Employees	Other Persons	Total
United Kingdom (1905).....	166	437	577	1,180
Russia in Europe (1903).....	126	504	999	1,629
Germany (1904).....	74	565	599	1,238
France (1904) (a).....	18	226	577	821
Austria (1904).....	13	65	92	170
Hungary (1904).....	13	60	116	189
Italy (1903).....	8	83	63	154
Spain (1903).....	57	40	115	212
Portugal (1904).....		b	55	55
Sweden (1903).....	7	30	47	84
Norway (1905).....			4	4
Denmark (1904-05).....	1	c	12	13
Belgium (1904).....	6	36	61	103
Holland (1904).....		18	31	49
Switzerland (1904).....	11	24	29	64
Roumania (1903-04).....	3	16	37	56
Total.....	503	2,104	3,414	6,021

a. Train accidents only. Other accidents to passengers included under "Other persons."

b. Including passengers and employees.

c. Including employees.

There is reason to believe that, outside of the United Kingdom and Germany, these returns are anything but exhaustive. In the case of France, for instance, where the railway returns give the number of employees killed as 226 and injured 509, the Bulletin of Labor for 1904 gives the number of employees in the transportation industry, killed, 374; permanently disabled, 513; temporarily disabled (exceeding four days), 32,788; results unknown, 655; total casualties, 34,350.

The total reported casualties for other European countries are incredibly small when compared with these French totals, or the definite total of 19,416 for the United Kingdom.

XV

CAUSES OF RAILWAY ACCIDENTS

Fortunately for the British public, it has a system of investigation into the causes of railway accidents which enables an intelligent fixing of responsibility. In 1905 Lieutenant Colonel Yorke, chief inspector, and his corps of three deputy inspectors, two assistant inspectors and three sub-inspectors investigated 24 train accidents and 789 other railway accidents. The inquiries into the causes of the train accidents resulted in the following findings—more than one cause contributing to some of the accidents:

Want of clearance for structure at side of line.....	1
Negligence, want of care, and mistakes on the part of servants of the railway companies.....	21
Excessive speed, having regard to engines, road or other circumstances.....	7
Foggy weather.....	2
Other or doubtful causes.....	3

During the year 1905, 789 inquiries were held by the assistant inspecting officers and sub-inspectors into accidents other than train accidents, involving fatal or other injuries to 804 persons, with the following results:

Misadventure or accidental.....	134
Want of caution or misconduct on the part of the injured person.....	355
Want of caution or breach of rules, etc., on the part of servants other than the person injured.....	135
Defective apparatus or defects in permanent way, works, etc.....	92
Want of appliances or safeguards or insufficient staff, or unsatisfactory system of working.....	47
Neglect or non-observance of Rules under the Railway Employment (Prevention of Accidents) Act, 1900.....	26
Total number of inquiries held.....	789

With unmistakable certainty these two tables point to negligence, want of care and disobedience in British railway employes as the chief causes of accidents involving the lives of travelers, of their fellow employes and of themselves. If similar prompt, unprejudiced and experienced official investigation were instituted in the United States, there is no reason to doubt like causes would be found in practically the same proportions.

OVERWORK SELDOM FOUND AS A CAUSE OF RAILWAY ACCIDENTS.

Search will be made in vain through the records of inquiries into the causes of British railway accidents to find one attributed to overwork. In the United Kingdom, as in the United States, there is evidence of the coincidence of long hours and accidents; but nowhere do the inspectors, after an exhaustive investigation, find overwork as the primary or even a possibly contributory cause.

In the reports of the inspectors they almost invariably give the hours for which the employe responsible for the accident was booked and "How long on duty at time of accident." The examination of the four quarterly reports for the year ending June 30, 1906, shows that 67 per cent of such employes were booked for 11 hours or more per diem, and that 42 per cent of them were booked for 12 hours or more per diem.

A further examination of how long such employes were on duty at the time of accident gives the following interesting and somewhat surprising result:

HOW LONG ON DUTY AT TIME OF ACCIDENT.

Three Months	Off Duty	HOURS																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
1st quarter . . .	3	10	9	18	20	10	17	14	18	17	15	6	9	..	..	..	..	1
2d quarter . . .	2	14	23	11	23	18	28	21	17	23	11	12	10	2	1	1	..	1
3d quarter . . .	..	17	18	20	24	14	21	19	18	15	15	14	11	..	2	1	..	..
4th quarter . .	1	11	12	21	19	21	17	14	17	19	20	10	9	5	1	1	..	..
Year	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	..	2

The student will examine these figures in vain for any evidence that liability to accident increases with length of hours. There were more accidents during the second hour of duty than during the tenth, although the same number were at work. The absolutely adventitious nature of railway accidents, so far as they relate to the hours of employment, is reflected in every figure of this table. They are as liable to occur, as some of these did, within ten minutes after going on duty as in the ten minutes before going off.

While there is no official investigation into the causes of railway accidents in the United States, as in England, the fragmentary analysis of the serious collisions by the Interstate Commerce Commission in its Accident Bulletins since 1901 indicates that negligence and disobedience of regulations are responsible for 80 per cent of

the fatalities. *The Railway Age* of January 25, 1907, gives a tabulation of these bulletins, from which it appears that only 5.4 per cent of the collisions in which the fatalities were only 1.8 per cent of the whole number, were coincident with "excessive hours." And there is not one scintilla of evidence that any of these collisions were the effect of the excessive hours. Here is a specimen of one of these statements from which it is inferred that "excessive hours" was the cause of a collision which resulted in the death of one person and a loss of \$5,900.

Bulletin No. 11, page 5, No. 8—Butting Collision.—"Flagman, who had been ordered to hold one of the trains, went into a caboose to get red light; sat down to warm himself and dry his clothes; fell asleep; had been on duty 16½ hours."

It was not a case of overwork, but of criminal negligence and disobedience of orders.

New Hampshire is one of the states of the Union in which railway accidents receive intelligent consideration and investigation. In the last report of the Railway Commissioners of this small state (1906), I find the following:

"In *twenty* years only two persons have been killed and only three seriously injured in passenger steam cars in New Hampshire. Last year there were none."

New Hampshire has only 1,266 miles of railway, but this mileage multiplied by *twenty* gives a total greater than the aggregate mileage of the United Kingdom.

From the same report it appears there were 38 railway fatalities in New Hampshire during the year, eleven of the victims being railway employes and 27 not. An instructive light is thrown upon the whole subject of railway accidents by the Commission's brief summary of the causes of the last mentioned deaths, which is as follows:

"Of those not in railway employ—

One was a mailcarrier, struck by a mail crane;
Seven were killed on crossings;
Seven were trespassers, who were walking upon the track;
Seven were lying upon or beside the track;
Two were trying to board moving trains;
Two jumped in front of trains, and
One was killed getting off moving train.

"Of the railroad employes—

Three were killed in head-on collisions;
Three fell from train;

*One stepped in front of train;
 One was thrown between car and engine;
 One was crushed between a locomotive and its tender;
 One was crawling under car, and
 One was sliding down Mt. Washington Railway."*

In no less than seven of the fatalities to "other persons," "intoxicating liquor" played the part of chief contributory cause, and in one case it explained the death of an employe off duty at the time of the accident.

These details are gleaned from the special reports of the Commissioners who investigated each case. Their report on the one fatal collision is worthy of reproduction in its entirety, because it throws a flood of light on the characteristic national habit of heedlessness, which leads to such a large proportion of accidents to railway employes. It also has material bearing on the part sleep, during short or long hours on duty, plays in causing accidents. The report in full is as follows:

"Death of Hugh E. Shaw, S. H. Maclean and F. R. Tarbell.

STATE OF NEW HAMPSHIRE.

In Board of Railroad Commissioners.

Concord, N. H., April 16, 1906.

Investigation at Manchester, April 9, 1906.

Witnesses: W. R. Mooney, Superintendent, Nashua, N. H.; J. F. Duffy, Conductor of No. 341, Nashua, N. H.; Alfred Betters, head brakeman of No. 341, Nashua, N. H.; J. H. Burgoin, middle brakeman of No. 341, Nashua, N. H.; F. D. Eccleston, flagman of No. 341, Nashua, N. H.; J. A. Reed, telegraph operator, Windham Junction, N. H.; D. P. O'Sullivan, conductor of No. 372, Nashua, N. H.; W. S. Sanborn, brakeman, Nashua, N. H.; William Bennett, fireman, Nashua, N. H.; G. H. Woods, brakeman, Nashua, N. H.; George E. Ferris, engineer, Nashua, N. H.

On Friday, March 16, 1906, at nine o'clock in the evening, an extra freight train left Nashua to run to Rochester over the Worcester, Nashua and Portland Division of the Boston & Maine Railroad. Its crew consisted of Hugh E. Shaw, engineer; Mr. McLean, fireman; Albert Betters, head brakeman; J. H. Burgoin, middle brakeman, and F. D. Eccleston, flagman. It reached Rochester at 12:30 A. M. on the seventeenth, and an hour later the crew left that place for Nashua with an extra freight, numbered 341, which consisted of nineteen cars, the locomotive and buggy. This train arrived at Windham Junction at 4:30 o'clock A. M., and engineer Shaw and conductor Duffy went into the telegraph office for orders. The operator, James A. Reed, gave each of them a copy of the following order, which both read aloud in his presence and in the presence of each other, and signed in accordance with the rules:

"For Windham Junction. C. & E. Ex. 341, No. 332.

"Frt. extra 372, three seventy-two, and No. 305, three hundred and five, will meet No. 332, three thirty-two, and Frt. Extra 341, three forty-one, and Frt. Extra 1029, ten twenty-nine, and Frt. Extra 1017, ten seventeen, at West Windham. No 332, three thirty-two and Frt. Extra 341, three forty-one, and Frt. Extra 1029, ten twenty-nine, and Frt. Extra 1017, ten seventeen, have right over No. 307, three hundred seven, Hampstead to Nashua Junc.

"W. R. MOONEY,

"G. E. G."

The meaning of this, which was perfectly understood by Mr. Duffy, was that his train, No. 341, and three others that were following it, were to proceed to West Windham, run upon a siding and wait for an extra, No. 372, and a regular, No. 305, from Nashua, to pass, when they would have the right of way to Nashua. Having received and read it, it was the duty of the conductor to read it to the middle brakeman and flagman, and of the engineer to read it to his fireman and head brakeman, who were in the engine. Upon the receipt of the order Mr. Shaw went to his engine and Mr. Duffy to the caboose, where Eccleston and Burgoin were, and the train started for West Windham, where it was sidetracked. As soon as they reached West Windham Mr. Duffy, having shown the order to the brakeman and hung it on the hook over his desk, lay down and went to sleep, as did Eccleston and Burgoin a few minutes later. When the train had been upon the siding about twenty-five minutes, No. 305, the regular from Nashua, passed, going east upon the main track, and Betters, by Shaw's order, set the switch so as to let them out, and Shaw ran out upon the main and proceeded towards Nashua. When they had gone about a mile and a half, they met extra No. 372, which, according to orders, was running towards Rochester, and a head-on collision occurred, wrecking the locomotives, smashing several of the cars, fatally injuring engineer Shaw and killing engineer McLean of No. 341 and Brakeman F. R. Tarbell of No. 372. Mr. Betters of No. 341 was badly bruised, but recovered in three weeks, and engineer Ferris of No. 372 was injured, but not seriously.

None of the others were seriously injured. No blame attaches to any of the crew of No. 372, which consisted of conductor D. P. O'Sullivan, engineer Ferris, fireman William Bennett, brakeman William Sanborn and F. R. Tarbell. They had received at Nashua orders corresponding to those given No. 341 at Windham Junction, were running in strict accordance with them, were all at their posts and attentive to their duties.

The accident was due primarily to a mistake by engineer Shaw, who paid the penalty with his life. In his absence it cannot be ascertained exactly what that mistake was, but as he ran the train off the siding and started it towards Nashua, and as it is inconceivable that he did this knowing that it would meet head-on another going in another direction, and as there is no evidence that he was asleep while standing on the siding, the reasonable suggestion is

that, having misread the order, he had it in mind that he was to wait for but one train, and, having seen No. 305 pass, started, believing the track was clear.

All the testimony supports this view. Mr. Betters says that, when Shaw returned to the engine at Windham Junction, he asked him what orders he had and he replied, "to meet No. 305 at West Windham," and Mr. Duffy testifies that after the collision, while Shaw was being taken from the wreck, he asked, "Did we have a meet on that extra at West Windham," and was told they certainly did. It does not appear that brakeman Betters or fireman McLean who was killed, were in any way at fault. Mr. Shaw should have, read them the order when he went to his engine at the junction, but Betters swears that he did not, and there is no evidence that he informed them in any way of its contents. If he had, one or both of them would doubtless have known they were to meet two trains and advised him that only one had passed. Duffy, Burgoin and Eccleston, who were asleep in the caboose, were awakened by the jar when the train started. They understood perfectly that they were to meet No. 305 and No. 372, but as they saw No. 305 had gone by, supposed No. 372 had preceded it, and some remark to the effect passed between them. So, supposing they apprehended no trouble until the collision took place. If either of them had been awake and alert, he would have seen that only No. 305 had gone by, and should, and doubtless would, have informed Shaw of his mistake. All of them agree as to the facts and frankly admit their mistake, which proved so fatal. The members of the two crews were all spare men, who worked when called to run extra trains, but they are all experienced on that division; Duffy having been in the service three and one-half years, Shaw ten years, Eccleston four years, Burgoin three years, Betters five and one-half months and S. H. McLean nine months. None of them claim to have been overworked, or that they had not had ample time in which to sleep before they left Nashua at nine o'clock Friday evening.

It developed during the investigation that there is an agreement between the company and the men that when they have been on duty continuously as much as sixteen hours they shall not be called again until they have had nine hours' rest, and that these spare men had not worked any day that week an average of more than nine hours in each twenty-four. On Friday, Betters and Eccleston reached Nashua on a train from Portland at 3:45 in the morning, and had from that time until 8:30 in the evening, or about seventeen hours, when they were called for No. 341, which left at nine. Duffy reached Nashua at 9:17 A. M., and had until 8:30 P. M., or about eleven hours; Burgoin had not worked after Thursday at 2:40 P. M.; Shaw reached Nashua from Portland Thursday at 4 A. M., and had until 8:30 P. M., or sixteen hours; but some of them had not taken the sleep they needed, having occupied the time otherwise about their homes and calling upon friends.

HENRY M. PUTNEY.

ARTHUR G. WHITTEMORE.

GEORGE E. BALES.

XVI

GENERAL SAFETY OF RAILWAY TRAVEL

That there is a reverse and reassuring side to the dark picture afforded by the statistics of railway accidents continually paraded before the public, is not only shown by the tables of the numbers carried relatively to the numbers killed, given in the preceding pages, but is emphasized in the following statement showing the complete immunity of passengers from fatal accidents on a majority of the railway mileage in the United States during the years 1906 and 1905.

ROADS ON WHICH NO PASSENGER WAS KILLED IN A TRAIN ACCIDENT
IN THE YEARS ENDING JUNE 30, 1906 AND 1905.

	1906	1905
Number of operating companies.....	279	104
Mileage of 279 companies.....	119,462	104,596
Passengers carried.....	398,484,008	362,795,534
Passengers carried 1 mile.....	12,414,934,000	10,909,856,254
Tons of freight carried.....	821,095,288	372,214,167
Tons of freight carried 1 mile.....	104,934,118,000	47,535,935,531
Passengers killed in train accident.....	NONE	NONE
Passengers injured in train accident.....	2,533	1,683

Account was also taken of the roads on which only one passenger was killed in a train accident during the years mentioned, with the following result:

ROADS ON WHICH ONLY ONE PASSENGER WAS KILLED IN A TRAIN
ACCIDENT DURING THE YEARS ENDING
JUNE 30, 1906 AND 1905.

	1906	1905
Number of operating companies.....	12	13
Mileage of 12 operating companies.....	31,141	33,268
Passengers carried.....	111,394,935	113,685,234
Passengers carried one mile.....	4,018,143,000	4,688,312,231
Tons of freight carried.....	162,170,924	131,053,807
Tons of freight carried one mile.....	33,498,652,000	25,678,085,628
Passengers killed in train accidents.....	TWELVE	THIRTEEN
Passengers injured in train accidents.....	1,170	927

Combining these tables for 1906, we have a mileage greater than that of the United Kingdom, Russia in Europe, Germany,

France, Austria-Hungary and Italy combined, a passenger mileage greater than that of either the United Kingdom or Germany, and a ton mileage greater by 50 per cent than all Europe combined, with only twelve passengers killed and 3,753 injured in train accidents during the year.

The aggregate of safety in railway travel in these tables is as amazing as the annual aggregate of railway accidents is deplorable, but railway statistics are more concerned over the one death than the many millions who travel safely.

In order to reduce the mortality to a minimum, we should have intelligent and unprejudiced official investigation into the causes of railway accidents.

XVII—STATISTICS OF

Below is given a table showing the mileage of the railways of respective capitalization or cost of construction, passenger, freight ber of passengers and tons of freight carried, average passenger

It is to be regretted that the information is not as complete as the railway situation in Europe as a whole, while being fairly com-

Year	Country	Miles of Line	Capital or Cost of Construction	Receipts from Passenger Traffic	Receipts from Freight Traffic	Receipts from Other Sources	Total Receipts
1905	United Kingdom.	22,847	\$6,247,240,553	\$237,266,984	\$274,724,438	\$40,904,639	\$552,896,062
1903	Russia in Europe.	30,050	2,833,853,000	57,918,960	239,397,750	27,363,495	324,680,205
1904	German Empire.	33,423	3,374,890,218	152,819,800	349,455,876	38,202,094	540,477,770
1904	France.	24,755	3,366,306,000	132,414,010	155,287,753	4,640,178	292,341,942
1904	Austria.	12,710	1,378,308,847	35,004,164	100,170,283	5,269,560	140,444,008
1904	Hungary.	11,069	695,188,847	16,323,636	44,146,613	2,290,449	62,760,698
1903	Italy.	10,016	1,102,811,500	25,951,544	38,451,919	3,119,982	69,523,446
1903	Spain.	8,559	219,150,000	.....	.....	.....	56,606,900
1903	Sweden.	7,551	230,242,016	9,160,362	17,162,264	547,220	26,869,847
1905	Norway.	1,526	57,087,216	1'877,041	2,384,460	97,281	4,358,783
1905	Denmark.	1,992	52,352,500	4,358,233	4,372,280	688,451	9,418,966
1904	Belgium.	2,837	408,836,500	15,916,549	33,306,098	1,107,966	50,330,615
1904	Holland.	2,060	139,769,000	9,797,946	9,556,746	1,033,140	20,387,832
1904	Switzerland.	2,603	269,063,858	13,183,877	16,447,349	1,513,822	31,145,049
1904	Portugal.	1,416	not given	3,905,286	5,243,648	433,408	9,582,343
1904	Bulgaria.	1,072	29,707,000	.....	.....	.....	.....
1904	Servia.	440	24,350,000	.....	.....	.....	.....
1904	Roumania.	1,974	150,579,877	3,754,660	7,463,931	393,234	11,611,826
1904	Turkey in Europe.	1,269	not given	.....	.....	.....	.....
1904	Greece.	830	not given	.....	.....	.....	.....
		178,999	\$20,579,756,932	\$709,653,052	\$1,297,571,408	\$129,604,919	\$2,203,436,292
1906	United States....	216,973	13,805,258,121	472,694,732	1,450,772,838	159,014,736	2,082,482,406

* Estimated.

NOTE.—The total mileage in this table does not agree with that on page 9, because the *fur Eisenbahnerwesen*, the Russian mileage included that of Finland (2037), the French total is any authority for its being, the German total is 1,103 miles larger than official returns, and there and particular information becomes accessible.

EUROPEAN RAILWAYS

Europe in the years specified, by countries, together with their and other receipts, total earnings and expenses of operation, num-journey and mean freight haul.

could be wished, but it is sufficiently so to afford a general view of prehensive so far as the principal countries are concerned.

Total Expenses	Ratio Expenses to Receipts	Passengers Carried	Mean Journey (Miles)	Tons of Freight Carried	Mean Haul (Miles)	
\$341,219,778	61.7	1,199,022,102	7.95	461,139,451	24.86	United Kingdom
207,812,900	64.0	118,613,000	67.48	169,349,818	147.92	Russia in Europe
341,845,112	63.2	1,029,536,000	14.34	408,221,000	62.55	German Empire
151,887,720	51.9	433,912,983	19.59	130,143,810	78.86	France
95,671,229	68.1	182,518,503	.....	125,021,748	.....	Austria
38,103,055	60.7	78,452,000	.....	52,684,000	.....	Hungary
50,292,540	72.3	68,031,232	.....	23,688,410	.....	Italy
27,792,000	49.1	39,600,000	.....	.....	.....	Spain
17,842,285	66.4	36,269,684	16.55	25,650,686	44.64	Sweden
3,446,026	79.1	9,805,407	14.81	3,720,257	34.78	Norway
7,562,038	80.3	24,190,606	.....	4,209,990	.....	Denmark
30,157,350	59.9	152,865,367	13.99	61,098,435	.....	Belgium
17,115,150	82.0	38,687,000	17.79	13,750,000	58.21	Holland
20,587,797	66.1	75,415,515	.....	12,816,208	.....	Switzerland
4,439,216	46.3	13,112,637	.....	3,607,168	.....	Portugal
.....	.....	.....	.....	.....	.....	Bulgaria
.....	.....	.....	.....	.....	.....	Servia
6,637,545	57.1	5,234,683	.....	4,731,195	.....	Roumania
.....	.....	.....	.....	.....	.....	Turkey in Europe
.....	.....	.....	.....	.....	.....	Greece
\$1,362,411,641	61.8	3,505,266,719	*13.0	1,499,832,176	*60.00	
1,390,602,152	66.8	738,834,667	32.21	1,427,731,905	130.60	United States

other data had to be assembled from other sources. In the former table, credited to *Archiv* swelled by 3687 miles of private roads, the Belgian total is 1,532 miles larger than there seems are other discrepancies. All of these figures are submitted subject to revision as more recent

This table might well be entitled "The Vindication of American Railways." Roughly speaking, it shows:

European railways capitalized at twice as much per mile.

European railways earning 50 per cent more from passenger traffic.

American railways earning 11 per cent more from freight traffic.

European gross earnings \$120,955,866 more.

European working expenses \$28,190,511 less.

European net earnings \$149,144,397 more.

European passengers carried, nearly five times as many.

American passenger journey about 146 per cent longer.

European passenger receipts \$336,958,320 more

European freight carried only 5 per cent more.

American freight haul about 117 per cent longer.

American freight receipts \$153,201,430 more.

European passenger receipts per mile (about) 1.55 cents

American passenger receipts per mile (official), 1.962 cents.

European freight receipts per mile (about) 14.20 mills.

American freight receipts per mile (official), 7.66 mills.

If the European passenger receipts per mile had been applied to American passenger traffic in 1905, the passenger receipts of American railways would have been about \$104,000,000 less than they were.

If the European freight receipts per mile had been applied to American freight traffic in 1905, the freight receipts of American railways would have been nearly \$1,200,000,000 more than they were.

This shows a net saving to the American public of over a billion dollars annually by reason of the difference in the way American railways adjust their fares and rates.

If American railways were capitalized at the average European figure per mile, their capitalization would be over \$25,300,000,000.

The reason why the expenses of operating American railways is greater than that of the railways of Europe, aside from their greater mileage, is to be found in the following review of the wages paid railway employees in the principal countries of Europe.

XVIII

RAILWAY WAGES IN CERTAIN EUROPEAN COUNTRIES

It is not a simple task to present a satisfactory statement of railway wages abroad, because in no two countries are the statistics kept in the same form, nor does any other country go into the subject with anything like the thoroughness that obtains in the United States. The information given below is from official sources, so far as I have been able to secure it.

IN GREAT BRITAIN.

According to Professor Walter E. Weyl, in Bulletin No. 20, Department of Labor (1899), the wages of the three classes named were as follows:

	Per Week	Average
Engineers.....	\$7.30 to \$14.60	\$9.73
Firemen.....	99% less than 7.30	.....
Passenger conductors.....	90% from \$4.87 to \$7.30	.....
	10% over \$7.30	.....

That there has been no material increase in the pay of British railway employees since 1899 is proved by the fact that, while the average weekly pay of 431,858 "servants" in the employ of the 27 leading companies in that year was \$6.06, it was only \$6.01 in 1904. These figures cover "The work people employed in the coaching, goods, locomotive and engineers' departments of the railway companies." The 27 companies employ over 90 per cent of the total number of railway "servants." (*Vide* Abstract of Labour Statistics of the United Kingdom, X 1902-1904, page 60.) This would yield an average annual wage of about \$312.00, against an average of over \$615.00 in the United States

According to the last returns to the Railway Department of the British Board of Trade, there were 581,664 persons employed on British railroads. The total wages paid on fourteen roads, doing 84 per cent of the traffic, and employing 465,331, or 80 per cent, of the entire railway force, were \$128,342,635, or \$276 per employe

The average pay for the United Kingdom is less than this, for no roads in Ireland, where wages are lower than in England or Scotland, were included in the fourteen for which figures are given.

There were 67,135 persons employed in the working of locomotive engines on all British roads in 1905. The total wages paid in this department of the fourteen roads reporting was \$25,971,060. Estimating that these roads employed 80 per cent of the total, would give them 53,708 persons, who would receive on an average \$483 per year.

The average compensation of locomotive engineers and firemen in the United States in 1905 was \$1,010 per annum.

IN GERMANY.

According to Professor Weyl, as above, the wages in the three classes of German railway employes in 1898 per year were as follows:

	Minimum	Maximum
Engineers.....	\$285	\$523
Firemen.....	238	357
Conductors.....	190	285

In 1898, Consular Report No. 217 gave the pay of engineers on German railways as \$1.19 to \$1.70 per day; of firemen as 78 cents to \$1.09 per day, and of conductors from 51 cents to \$1.16 per day. In 1899 the annual average wages of all classes of employes on German railways was \$335.10.

The official statistics of German railways do not give the number of employes and compensation by wage classes as ours do; but they do divide them up into departments, so that we can arrive at an approximation of what they are by the following from the official returns for 1904:

DEPARTMENTS	Average Pay Per Year	
	State Roads	Private Roads
Administrative.....	\$710	\$615
Maintenance and guarding of road.....	202	220
Station service and train crews.....	340	308
Switching crews and shops.....	342	329

In Germany railway employes are classified as officials and laborers. The former are again divided into those receiving established salaries and those paid by the day. In the department of

"Station service and train crews" the number and average pay of these classes is as follows:

	Number	Average Pay Per Year
Officials on established salaries.....	118,138	\$433
Officials paid by the day.....	14,918	296
Laborers paid by the day.....	116,844	248

Enginemen, firemen, conductors and other trainmen are included in the first of these three classes. The earnings of the same class of railway employes in the United States average \$940 per year.

Germany is the only European country whose official statistics give the number and compensation of all railway employes. In 1904 there were 582,369 persons employed on the railways of Germany whose total compensation was 785,533,107 marks (\$188,527,945), or \$324 per person per year.

In the same year there were 1,296,121 persons employed on the railways of the United States, whose total compensation was \$817,598,810, or \$631 per employe per year.

IN FRANCE.

According to Professor Weyl, the pay of two of the three classes of employes on the state railways of France was as follows:

Engineers.....	\$1.43 to \$1.82 per day
Firemen.....	1.09 per day

These figures include the estimated value of the premiums and gratuities, which complicate the wage situation in France. The material used in Professor Weyl's compilation was the result of an investigation by the French Bureau of Labor in 1891 and 1893. On a given pay day in February, 1895, according to the same Department of Labor, 64,156, or 90 per cent of the 71,273 males employed by the month on French railways, received 186 francs (\$35.90) or less per month; and of these, 32,219, or more than 50 per cent, received only 111 francs (\$21.43), or less per month. The same authority states that 63,858, or nearly 95 per cent of the 67,314 males "employed by the day or hour or on piece wage" on French railways, received 65 centimes (12½ cents) or less per hour, while 32,375, or more than 50 per cent of these, received 35 centimes (6½ cents) or less per hour.

The employment of women on French railways creates another division and lower rate of wages. Of 15,319 females employed by the month at the date of the above compilation, no less than 15,259 received 56 francs (\$10.80) or less per month; while 12,978 or nearly 85% of these received 26 francs (\$5) or less per month.

Only 98 of the 3,718 females employed by the day, hour or piece on French railways received more than 17½ centimes (3½ cents) per hour.

As near as can be ascertained, the average compensation of French male railway employes is slightly over one-third the average of American railway employes. In other words, it is about 75 cents a day against an average of \$2.08 here.

IN AUSTRIA-HUNGARY.

Reports are singularly silent as to railway wages in Austria and Hungary. The latest abstract of Foreign labor statistics of the British Board of Trade (1906) shows that 87% of the workmen engaged in railway construction in Hungary receive from \$1.20 to \$4 per week; more than 60% of them receiving less than \$2.80 per week. Of 7,560 men in the railway shops of Hungary 7,382 or 97% received from \$1.20 to \$6.00 per week and 75% of these received \$4.00 or less per week.

The average pay of railway shopmen in the United States is \$12.42 per week or more than three times the average of the railway shopmen of Hungary.

It is safe to conclude that the pay of engineers, firemen and conductors on American railways bears about the same proportion to that of the same class on Hungarian railways.

XIX

RECOMMENDATIONS

If I were in a position to influence legislation, I would suggest:

REPORTS.

First, that the annual reports to the Commission required under the Act to Regulate Commerce be confined to those common carriers operating railroads engaged in interstate commerce as defined by the Act. This would simplify the task of the official statistician by excluding all duplications and extraneous information relating to non-operating railroad companies, which merely muddle his conclusions.

ACCIDENTS.

Second, That Congress provide for an official investigation of all railway accidents in the United States on lines patterned after the methods so successfully adopted in the United Kingdom. It should be a bureau of the Department of Commerce and Labor composed of:

One Chief Inspector.

Ten District Inspectors, one for each of the groups into which the country is divided, in railway statistics, appointed from U. S. A. engineer service with rank of Major.

Three Deputy Inspectors for each group.

Three Assistant Inspectors for each group.

Three Sub-Inspectors for each group.

Several groups might require four inspectors of each class and as many could get along with only two.

The various kinds of accidents should be apportioned among these inspectors according to their nature, as they are in Great Britain, and the inquiries should follow without delay as they do there.

Quarterly reports of the results of these inquiries should be published for each group separately; and the Chief Inspector should issue a General Report annually—including the statistics of accidents for the whole country and such comments on the findings of his staff as their nature might justify.

ACKNOWLEDGMENTS.

In conclusion, I wish to acknowledge the indebtedness of this Bureau to the executives and accounting officers of the various railways through whose courtesy and assistance the work has assumed its present comprehensive character.

Respectfully submitted,

SLASON THOMPSON.

RAILWAY STATISTICS
OF THE
UNITED STATES OF AMERICA

FOR THE YEAR ENDING JUNE 30

1907

COMPARED WITH
THE OFFICIAL REPORTS OF 1906
AND
RECENT STATISTICS OF FOREIGN RAILWAYS

PREPARED FOR THE
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By SLASON THOMPSON
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INTRODUCTION.

The year ending June 30, 1907, brought to a conclusion a period of railway achievement without parallel in the industrial history of the republic—a record of material prosperity only surpassed in its record of public service. It also put a period to one system of comparative railway statistics, for with 1908 the Interstate Commerce Commission inaugurates a new one.

As I write, there is no question that, for a time at least, the swelling tale of railway progress is checked. Decreases mark the returns where for a decade increases have been the almost invariable rule. Much needed construction hesitates on palsied feet. At the opening of the year 1908, over 300,000 idle freight cars bore silent testimony to the imperative halt called to the industry of the country by unreasoning popular clamor. It boots little whence the blow came, the effect was felt throughout the 330,000 and odd miles of track that form the arteries of commerce and communication for 87,000,000 people.

Between October, 1907, and January, 1908, reports to the Interstate Commerce Commission for over 223,000 miles of line showed a decrease of 31% in earnings per mile for these months, and the ratio of expenses to earnings had risen from 67% to 76%.

Today returns to this office show that approximately 340,000 railway employes are idle as the result of the present industrial stagnation. This means that at least 1,500,000 souls directly dependent on railway revenues for their daily bread are without their accustomed source of supply.

Twenty years after the passage of the Act creating the Interstate Commerce Commission is a fitting time to take stock of the great industry it was proposed to protect as well as regulate. By their record made in the face of continuous criticism and heckling the railways can afford to abide intelligent judgment. They have a right to appeal from the condemnation of any particular misdeeds, which have been magnified in popular apprehension, to a broader recognition of their general achievements for the common weal. On their results they stand.

In order to fully appreciate what these results have been it is only necessary to present a comprehensive statement of the more significant facts then and now, together with those for the intermediate year of 1897. This is done in the following table:

**SUMMARY OF RAILWAY RESULTS IN 1888, 1897 AND 1907 WITH PER-
CENTAGE OF INCREASE IN EACH ITEM.**

	1888	1897	1907	In- crease over 1888	In- crease over 1897
				%	%
Miles of line.....	136,883	183,284	227,500	66.1	24.1
Miles all tracks.....	168,598	242,013	328,400	94.8	35.7
Net capitalization (thousands)...	\$7,366,745	\$9,168,071	\$13,064,279	77.3	42.5
Net capitalization per mile of line.	53,819	51,396	57,425	6.7	11.7
Net capitalization per mile of track	43,694	37,882	39,781	d9.0	5.0
Gross earnings (thousands).....	910,621	1,122,089	2,585,913	183.9	130.5
Expenses of operation (thousands)	594,994	752,524	1,746,097	193.3	132.0
Ratio expenses to earnings.....	65.34	67.06	67.52	3.3	0.7
Passengers carried one mile (thou- sands).....	10,100,744	12,256,939	28,405,000	181.2	131.7
Passenger revenue (thousands)...	237,266	251,135	568,900	139.8	126.5
Passenger revenue per passenger mile (cents).....	2.349	2.022	2.010	d14.4	d0.6
Freight tons carried one mile (thousands).....	61,027,464	95,139,022	242,000,000	296.7	154.3
Freight revenue (thousands).....	610,884	772,849	1,810,139	196.2	135.4
Revenue per ton per mile (cents).	1.001	.798	.748	d25.1	d6.2
Locomotives, number (1889).....	29,036	35,986	54,000	85.9	50.0
Locomotives, weight (tons).....	1,161,440	1,835,286	3,672,000	216.4	100.0
Passenger cars (1889).....	24,586	33,626	43,400	76.1	29.0
Freight cars, number (1889).....	829,885	1,221,730	1,995,000	140.4	63.3
Freight cars, capacity (tons).....	16,597,700	30,543,000	69,480,000	318.5	127.1
Average tons in train (1889)...	179	204	355	98.9	74.0
Employees, number.....	652,500	823,476	1,675,000	156.7	103.4
Employees, compensation.....	\$373,354,700	\$465,601,581	\$1,075,000,000	188.0	130.8
Taxes (1890).....	31,207,469	43,137,844	81,000,000	159.5	87.7

(d) Decrease.

Scrutinize this array of results with an impartial eye, as you will, and the open mind finally rests on the increase in nineteen years of 296.7 per cent in ton miles of freight carried as the supreme achievement of American railways. It is upon this point that all the construction and perfection of track and equipment is focussed. All the investment, earnings and expenditures of the railways are devoted to the public service in moving passengers, mails and freight—and the greatest, most essential of these three is freight. As has been truly said by Professor Johnson, "Social welfare is more dependent upon cheap and unfettered movement of commodities than upon inexpensive and speedy means of travel."

Next in importance to the unfettered movement of its millions of tons of freight, stands out the fact that it has been accomplished with

a continuously decreasing scale of receipts per ton mile, the result being that where the tonnage increased nearly fourfold the freight revenue increased less than threefold.

It is not in the record of miles of line, capitalization and gross earnings alone that the earnest student of railway problems will look for the means by which such achievements were made possible. And if he stops at the number of locomotives and cars, he will miss the true explanation of the phenomenon. It is in the weight and power of the locomotives, the capacity of the cars and the constant improvement of the roads that he will find the secret of a fourfold multiplication of the freight service. He will perceive that the increase in the capacity of the cars has been more than commensurate to the increase in tonnage, while that in the power of the locomotives, applied on the easier grades of the period, has been adequate to the amazing demand.

Not the least interesting feature of these results is the proof that the increase in the compensation of employes has more than kept pace with the remarkable expansion of railway revenues during the past nineteen years.

Comparison might profitably be instituted between the great advance in railway taxes and the moderate increase in capitalization.

This whole table is a confirmation of the saying of John Bright that "The railways have rendered more services and received less gratitude than any other institution in the world."

THE STATISTICS FOR 1907.

The figures for 1907 in the foregoing statement are a composite of those contained in the brief "Preliminary report of the income and expenditures of the railways" issued in December by the Interstate Commerce Commission, representing 225,584 miles of line; and the data gathered independently by this Bureau for the same period from 345 operating companies having a mileage of 212,357. The following statement shows all the essential facts vouchsafed by the Commission's preliminary income account for 1907:

Companies represented.....	894
Operated mileage reported.....	225,584
Percentage of total approximated.....	99
Gross earnings.....	\$2,585,913,002
Expenses of operation.....	1,746,097,122
Ratio of expenses to earnings.....	67.52
Passenger earnings, including mail, etc.....	683,980,921
Freight earnings.....	1,826,209,111
Miscellaneous earnings.....	75,722,970
Income from other sources.....	157,534,585
Interest, rents, betterments, *taxes and other charges.....	605,916,745
Dividends.....	259,233,580
Surplus.....	132,200,140
*Taxes (operating roads only).....	73,617,082



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SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES, AND ITS RELATION TO AREA AND
POPULATION.—Continued.

State or Territory	1907 Operated (94 per cent)	1906 Owned (Official)	Miles of Line	
			Per 100 Square Miles of Territory	Per 10,000 Inhabi- tants
Missouri.....	8,145	8,065	11.74	23.55
Montana.....	3,319	3,290	2.26	122.63
Nebraska.....	5,998	5,823	7.59	49.63
Nevada.....	1,220	1,440	1.31	306.27
New Hampshire.....	1,211	1,259	13.98	27.75
New Jersey.....	2,031	2,292	30.53	11.06
New York.....	7,811	8,429	17.71	10.52
North Carolina.....	3,404	4,327	9.08	21.12
North Dakota.....	3,853	3,761	5.36	106.88
Ohio.....	9,046	9,147	22.79	20.26
Oregon.....	1,563	1,888	2.01	41.65
Pennsylvania.....	10,321	11,157	25.04	16.21
Rhode Island.....	190	212	20.11	4.49
South Carolina.....	2,886	3,216	10.78	22.01
South Dakota.....	3,472	3,218	4.19	72.66
Tennessee.....	3,463	3,698	8.89	16.66
Texas.....	11,777	12,440	4.76	37.17
Utah.....	1,770	1,775	2.21	59.51
Vermont.....	926	1,073	11.75	28.34
Virginia.....	3,704	4,001	10.19	19.99
Washington.....	3,244	3,537	5.38	63.02
West Virginia.....	2,610	3,167	13.08	30.49
Wisconsin.....	6,884	7,249	13.61	32.49
Wyoming.....	1,340	1,365	1.40	133.96
Arizona.....	1,460	1,882	1.67	138.99
District of Columbia.....	35	29	49.87	.97
Indian Territory.....	2,610	2,709	8.80	63.04
New Mexico.....	2,289	2,796	2.28	129.67
Oklahoma.....	2,794	2,790	7.18	63.56
Canada.....	1,053			
United States.....	212,357	222,572	7.55	26.78
United States, 1905.....		217,017	7.34	26.44
“ “ 1904.....		212,577	7.20	26.34
“ “ 1903.....		207,186	7.00	26.03
“ “ 1902.....		201,672	6.82	25.76
“ “ 1901.....		196,075	6.64	25.52
“ “ 1900.....		192,940	6.51	25.44
“ “ 1899.....		188,277	6.37	25.34
“ “ 1898.....		185,370	6.28	25.40
“ “ 1897.....		182,919	6.21	25.59
“ “ 1896.....		181,153	6.15	25.82
Increase in ten years.....		41,419		

It will be perceived that in eleven states—Colorado, Delaware, Illinois, Indiana, Kansas, Missouri, Montana, Nebraska, North

Dakota, South Dakota and Oklahoma—the mileage reported to this Bureau for 1907 exceeds the official mileage reported for the preceding year; while in other states the figures testify to the comprehensive character of the reports for 1907.

The significant feature of this table is that which shows the relation of miles of railway to area and population. The contrast between Rhode Island with its 20.11 miles of line per 100 square miles area and 10,000 inhabitants to each 4.49 miles, and Nevada with only 1.31 miles of road per 100 square miles, but 306.27 per 10,000 inhabitants, is a striking illustration of the wide difference in conditions under which railways are operated in the United States.

Only in states where the density of population to railway mileage approaches that shown in the table for Rhode Island, Massachusetts, Connecticut, New York and New Jersey is a two-cent passenger rate reasonable or practicable.

The table also shows that in the United States at large railway mileage has increased more rapidly than population.

RAILWAY MILEAGE IN FOREIGN COUNTRIES.

For the purpose of comparison with the preceding table the following figures of the railway mileage of foreign countries relatively to area and population in 1905 have been extracted from *Archiv für Eisenbahnwesen*:

FOREIGN RAILWAYS AND THE RATIO OF MILEAGE TO AREA AND POPULATION OF EACH COUNTRY IN 1905.

Country	Miles	Miles of Line	
		Per 100 Square Miles	Per 10,000 Inhabitants
Europe:			
Germany.....	35,094	16.7	6.2
Austro-Hungary (including Bosnia and Herzegovnia).....	24,804	9.5	5.3
Great Britain and Ireland.....	22,648	18.7	5.5
France.....	28,873	14.0	7.4
Russia in Europe, and Finland.....	34,160	1.4	3.0
Italy.....	10,119	9.2	3.1
Belgium.....	4,510	39.6	6.5
Netherlands and Luxemburg.....	2,198	15.0	3.5
Switzerland.....	2,665	16.7	8.0
Spain.....	8,967	4.7	4.8
Portugal.....	1 598	4.5	2.9

FOREIGN RAILWAYS AND THE RATIO OF MILEAGE TO AREA AND
POPULATION OF EACH COUNTRY IN 1905—Continued.

Country	Miles	Miles of Line	
		Per 100 Square Miles	Per 10,000 Innabi- tants
Europe—Continued			
Denmark	2,043	13.7	8.3
Norway	1,547	1.3	7.0
Sweden	7,882	4.5	15.3
Servia	379	2.1	1.5
Roumania	1,974	3.9	3.4
Greece	771	3.1	3.2
Turkey in Europe, Bulgaria and Rumelia	1,952	1.8	2.0
Malta, Jersey, Isle of Man	68	16.1	1.9
Total for Europe, 1905	192,251	4.8	4.8
“ “ 1904	189,806	5.0	4.8
“ “ 1903	186,685	5.0	4.8
“ “ 1902	183,989	4.9	4.7
“ “ 1901	180,817	4.8	4.6
“ “ 1900	176,396	4.7	4.5
“ “ 1899	172,953	4.6	4.5
“ “ 1898	167,614	.....	.....
“ “ 1897	163,550	.....	.....
“ “ 1896	160,030	.....	.....
“ “ 1895	156,228	4.0	4.1
Increase in ten years	36,023	.....	.....
Other Foreign Countries in 1905:			
Canada	20,597	0.6	38.6
Mexico	12,227	1.6	8.4
Brazil	10,442	0.3	7.0
Argentine Republic	12,409	1.1	25.4
British India	28,611	1.4	1.0
New Zealand	2,487	2.4	30.0
New South Wales	3,450	1.1	25.2
Victoria	3,428	3.9	28.5
South Australia	1,915	0.2	52.8
Queensland	3,193	0.5	65.8
West Australia	2,169	0.2	54.8
Cape Colony	3,510	1.1	19.9
Natal	906	3.4	11.6
Transvaal	1,334	1.1	15.3

It will be perceived that the United States has more miles of railway line than all Europe; that relatively to area its mileage is more than 50% greater, and 450% greater relatively to population. Only in the densely peopled state of Rhode Island is the average number of inhabitants per mile of line for all Europe approached.

MILEAGE OF ALL TRACKS.

In the multiplication of auxiliary tracks during the last ten years, American railways have shown a commendable appreciation of the traffic needs of the country. The following table classifies railway mileage under the several headings necessary to indicate where a large share of railway capital in recent years has been invested:

SUMMARY SHOWING MILEAGE OF SINGLE TRACK, SECOND TRACK, THIRD TRACK, FOURTH TRACK, AND OF YARD TRACK AND SIDINGS.

Year	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	Total Mileage Operated (All Tracks)
1907 (94%).....	212,357	18,956	1,958	1,378	73,939	308,588
1906.....	222,340	17,396	1,766	1,279	73,760	317,083
1905.....	216,973	17,056	1,609	1,215	69,941	306,796
1904.....	212,243	15,824	1,467	1,046	66,492	297,073
1903.....	205,313	14,681	1,303	963	61,560	283,821
1902.....	200,154	13,720	1,204	895	58,220	274,195
1901.....	195,561	12,845	1,153	876	54,914	265,352
1900.....	192,556	12,151	1,094	829	52,153	258,784
1899.....	187,534	11,546	1,047	790	49,223	250,142
1898.....	184,648	11,293	1,009	793	47,589	245,333
1897.....	183,284	11,018	995	780	45,934	242,013
1896.....	181,982	10,685	990	764	44,717	239,140

As the figures for 1907 represent only 94% of the actual mileage, this table indicates that the total mileage of all tracks that year was approximately 327,500, being an increase of 85,237 miles, or over 35% in ten years.

The increase in second track during the same decade was 7,938 miles, or 72%; of third track, 963, or 97%; of fourth track, 598, or 76%; and of yard track and sidings, 27,826, or 60%. It is the cumulative facilities afforded by these auxiliary tracks, combined with a corresponding increase in equipment, that has enabled the railways to handle an increase of over 132% in passenger traffic and 154% in freight traffic, where there has been an increase of only 24% in miles of line.

According to data compiled by the *Railway Age*, 5,874 miles were added to the railway mileage of the United States in the calendar year 1907. This would bring the total at the close of the year to approximately 230,000 miles of line and 330,000 miles of all tracks.

BRITISH TRACKAGE.

It may be of interest to compare these totals with the following statement of the trackage of the United Kingdom on December 31, 1904, 1905 and 1906, as reported to the British Board of Trade:

Description of Track	1906	1905	1904
Single track (miles).....	23,063	22,870	22,601
Second track.....	12,934	12,819	12,692
Third track.....	1,363	1,324	1,271
Fourth track.....	1,091	1,067	1,030
Fifth track.....	186	170	153
Sixth track.....	111	97	85
Seventh track.....	47	40	35
Eighth to thirteenth.....	75	44	34
Sidings.....	14,032	13,891	13,733
Total trackage.....	52,904	52,322	51,634

From this it appears that the United States has about 40% more track in yards and sidings, alone, than the total of all tracks in the United Kingdom; and more than six times as many miles of tracks of all descriptions.

II

EQUIPMENT

Less than a year ago the country re-echoed with impatient demands for more cars and motive power, and the cry went up to every state legislature in the land for "reciprocal demurrage" laws—i. e., laws to force railways to provide freight cars, whether they had them or not.

To-day (February 6th), the American Railway Association reports 343,217 idle freight cars against a shortage of 104,226 cars on the same date a year ago. This striking reversal of conditions is due to two causes—the feverish efforts of the railways in 1906 and 1907, to meet the demands of traffic, and the recession in traffic that has followed the panic of last fall.

Working at their full capacity, the locomotive and car builders in three years, according to the compilation of the *Railroad Gazette*, furnished the following rolling stock to the railways of the United States and Canada:

THREE YEARS' OUTPUT OF CARS AND LOCOMOTIVES.

Year	Locomotives	Passenger Cars	Freight Cars
1907.....	7,362	5,457	284,188
1906.....	6,952	3,167	243,670
1905.....	5,491	2,551	168,006

The relative character of this output during the past two years can be judged from the fact that the figures for each of the items in 1905 were then the highest on record. The locomotives built in 1907 averaged the most powerful ever built, and the *Gazette* estimated that 72% of the freight cars built that year were of steel or steel under-frame construction.

The effect of these efforts on the part of the roads to keep abreast of the traffic of the country is strikingly demonstrated in the increase in the number and capacity of locomotives in the following table, which covers the years since the Commission has included capacity in the published returns:

NUMBER AND CAPACITY OF LOCOMOTIVES, 1902-1907.

Year	Number	Tractive Power Pounds	Weight without Tender Tons
1907 (94%).....	52,082	1,332,082,840	3,564,590
1906.....	51,672	1,277,865,673	3,459,052
1905.....	48,357	1,141,330,082	3,079,673
1904.....	46,743	1,063,651,261	2,889,493
1903.....	43,871	953,799,540	2,606,587
1902.....	41,225	839,073,779	2,323,877
Increase, five years, per cent.....	26.3	58.8	53.3

Complete returns will raise the figures for 1907 approximately to 54,000 locomotives, of 1,388,000,000 lbs. tractive power and 3,680,000 tons weight, exclusive of tenders. These last figures would denote an increase of over 104% in the weight of locomotives during the last decade.

During the period for which the capacity of freight cars has been a matter of official record, the returns, supplemented with those for 1907 to this Bureau, are as follows:

SUMMARY OF CARS—PASSENGER AND FREIGHT—WITH CAPACITY OF LATTER.

Year	Passenger Service	Freight Service			Company's Service. Number
		Number	Capacity-tons	Average	
1907 (94%).....	41,180	1,895,375	66,701,405	35	83,903
1906.....	42,282	1,837,914	59,196,230	32	78,736
1905.....	40,713	1,731,409	53,372,552	31	70,749
1904.....	39,752	1,692,194	50,874,723	30	66,615
1903.....	38,140	1,653,782	48,622,125	29	61,467
1902.....	36,987	1,546,101	43,416,977	28	57,097
Five years' increase, per cent	11.3	22.6	53.4	25	47

Albeit the returns for 1907 cover only 94% of the railway mileage of the United States, this table in connection with the one preceding affords a convincing exhibit of the means by which American railways in 1907 were enabled to handle a traffic which had increased with unparalleled rapidity.

Between 1902 and 1907, the population of the United States rose from 79,000,000 to 86,000,000, or less than 9%. Complete returns would show that there was an increase of over 18% in passenger cars and passenger engines.

Between 1902 and 1907, there has been an approximate increase of 84 billion tons of freight carried one mile, or 53.5%. Complete returns will show that in the meantime there has been an increase of over 60% in both motive power and car capacity—to say nothing of the greater efficiency of both, by reason of reduced grades and improved track and roadbed.

COST OF NEW EQUIPMENT.

Estimating the average cost of freight cars built in 1907 at \$1,100; of passenger cars at \$8,500; and of locomotives at \$16,000, the *Railroad Gazette* concludes that the cost of the new equipment to the railways last year was as follows:

	Number	Cost
Locomotives.....	7,362	\$117,792,000
Passenger Cars.....	5,457	46,384,000
Freight Cars.....	284,188	312,607,000
Total.....		\$476,783,000

Allowing 10% to represent Canada's share in this cost, here is an expenditure of \$428,000,000 for equipment—the demand for which has disappeared since it was ordered.

SAFETY APPLIANCES.

Where ten years ago less than half the railway rolling stock in the United States was equipped with train brakes and automatic couplers, and twenty years ago, so far as the statistics disclose, it was practically devoid of them, with rare exceptions it is now completely equipped with these devices, as the following statement from the latest official report (1906) shows:

	Total Equipment 1906	Equipped with Train Brakes	Equipped with Automatic Coupler
Locomotives.....	51,672	51,186	51,269
Cars:			
Passenger.....	42,262	41,919	41,610
Freight service.....	1,837,914	1,689,141	1,820,854
Company's service.....	78,736	45,543	76,063
	2,010,584	1,827,789	1,989,796

From which it appears that American railway equipment is almost universally provided with the prescribed devices.

THE BLOCK SIGNAL SYSTEM.

Where as late as 1891, the official statistician stated that "At present a very small proportion of the railway system of the United States is operated on the block system"; and where the official statistics have hitherto failed to report the mileage so operated (although it is now promised) the *Railway Age* has compiled data showing that no less than 59,602 miles of line were, at the close of the year 1907, protected by some system of block signals, distributed as follows:

System	Single Track	Two or more Tracks	Total
Automatic Block (miles).....	4,704	6,770	11,474
Controlled Manual.....	2,621	870	3,491
Manual Telegraph.....	36,676	7,714	44,390
Staff or tablet.....			247
Total line.....	44,001	15,354	59,602

These figures show a gain during the year of over 6,000 miles of line equipped with some system of block signals, and indicate that more than one quarter of the mileage in the United States is operated under the block system.

In the light of the incontrovertible facts regarding the cost, capacity and present surplus of railway equipment in the United States, given in the foregoing tables, it seems scarcely credible that on December 23rd last, "car shortage" furnished a topic for the following utterance of the Interstate Commerce Commission:

"The general question of the provision of adequate transportation facilities unquestionably merits serious consideration by Congress. The whole problem, involving insufficient car and track capacity, and other incidents, may be said to be due to the fact that the facilities of the carriers have not kept pace with the commercial growth of the country. One eminent railroad president has estimated that during the period from 1895 to 1905, the traffic offered for carriage in the United States increased 110 per cent, while during the same period the instrumentalities for handling this traffic increased only 20 per cent.

"During the past decade, the commercial condition of the country has been one of increasing prosperity. If business undertakings proportionately increase during future years, the railroads of the country must add to their tracks, cars, and other facilities to an extent difficult to estimate. The ability of the carriers to transport traffic measures the profitable production of this vast country, with its ninety-millions of people, abundant capital, and practically unlimited resources. Manifestly, it is an economic waste for the farm, the mine, or the factory to put labor and capital into the production of commodities which cannot be transported to market with reasonable dispatch. If the present output cannot in many instances be transported except after ruinous delays, it is not reasonable to presume that capital will readily seek investment in new undertakings. It may conservatively be stated that the inadequacy of transportation facilities is little less than alarming; that its continuation may place an arbitrary limit upon the future productivity of the land, and that the solution of the difficult financial and physical problems involved is worthy the most earnest thought and effort of all who believe in the full development of our country and the largest opportunity for its people." (I. C. C. 21st An. Rep. p.8.)

Amazing as it may seem, in the very report containing this impeachment of the "alarming inadequacy" of the railways to cope with the expanding prosperity of the country, there was irrefragable proof that they were able to handle, and in the month of October, 1907, did handle, transportation on a scale equal to an increase of 140% on the passenger traffic and nearly 200% on the freight traffic of 1897.

Then came the drought of traffic, when the railways had prepared for a deluge, which it is not for me to trace to its source.

III

EMPLOYEES

NUMBER, 1,675,000. PAY ROLL, \$1,075,000,000

The increased cost of labor in 1907, coincident with legislative restrictions affecting their earnings, was a decisive factor in bringing the decade of progressive railway prosperity to an abrupt halt.

On June 30, 1907, there were 1,608,814 persons in the employ of the 345 railway companies reporting to this Bureau, whose pay-rolls for the year then ending aggregated the enormous sum of \$1,043,401,267.

From these figures it is safe to estimate that the total of railway employes in the United States on June 30th last, was 1,675,000 with a total pay-roll of over \$1,075,000,000.

In 1897, the figures were 823,476 and \$465,601,581 respectively. From which it appears that while the number of employes increased 103 per cent during the decade, their compensation increased over 133 per cent.

The first summary under this title gives the number, compensation and rate of compensation per day of the several classes of employes on the pay-roll of the roads reporting to this Bureau for the year ending June 30, 1907, to which is subjoined the aggregates for the preceding years, as reported by the Interstate Commerce Commission:

**SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF
PAY PER DAY BY CLASSES IN 1907, AND AGGREGATES
FROM 1889 TO 1907.**

Class 1907	Number (212,357 miles Represented)	Per 100 miles of Line	Compensation	Average pay per Day
General officers.....	3,932	2	\$15,776,620	14.10
Other officers.....	7,025	3	14,355,923	6.06
General office clerks.....	64,072	30	47,358,736	2.30
Station agents.....	33,715	16	23,843,644	2.06
Other station men.....	148,449	70	82,076,705	1.77
Enginemen.....	62,704	29	85,200,007	4.33
Firemen.....	66,500	31	50,895,471	2.56
Conductors.....	46,728	22	53,964,529	4.00
Other trainmen.....	128,880	60	96,908,172	2.77

SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF
PAY PER DAY BY CLASSES IN 1907, AND AGGREGATES
FROM 1889 TO 1907—Continued.

Class 1907	Number (212,357 miles Represented)	Per 100 miles of Line	Compensation	Average Pay per Day
Machinists.....	53,527	25	\$45,354,065	2.87
Carpenters.....	68,178	32	49,890,786	2.50
Other shopmen.....	216,918	102	130,912,486	2.06
Section foremen.....	39,419	19	25,019,817	1.88
Other trackmen.....	351,850	166	131,388,138	1.45
Switch tenders, crossing tenders and watchmen.....	47,709	23	29,349,838	1.89
Telegraph operators and dispatchers.....	38,488	18	28,619,742	2.27
Employees account floating equipment....	9,615	5	6,311,004	2.26
All other employees and laborers.....	221,105	104	126,175,584	1.92
Total (94% represented).....	1,608,814	757	\$1,043,401,267	2.20
1906 (official).....	1,521,355	684	a 930,801,653	2.09
1905.....	1,382,196	637	839,944,680	2.07
1904.....	1,296,121	611	817,598,810	No data
1903.....	1,312,537	639	775,321,415	No data
1902.....	1,189,315	594	676,028,592	No data
1901.....	1,071,169	548	610,713,701	No data
1900.....	1,017,653	529	577,264,841	No data
1899.....	928,924	495	522,967,896	No data
1898.....	874,558	474	495,055,618	No data
1897.....	823,476	449	465,601,581	No data
1896.....	826,620	454	468,824,531	No data
1895.....	785,034	441	445,508,261	No data
1894.....	779,608	444	No data	No data
1893.....	873,602	515	No data	No data
1892.....	821,415	506	No data	No data
1891.....	784,285	486	No data	No data
1890.....	749,301	479	No data	No data
1889.....	704,743	459	No data	No data

(a) Includes \$30,000,000 estimated pay-roll of Southern Pacific, whose records were destroyed in the San Francisco disaster.

In 1907, labor absorbed 41.63 per cent of gross earnings against 40.02 per cent in 1906.

It is unfortunate that prior to 1895, the official statistician did not realize the importance of including in his summaries the amount of compensation paid the several classes of railway employees, and has never attempted to give the average daily pay for all employees.

From this table, however, it appears that the number, compensation and average pay of railway employees in the year 1907, had reached the highest level of which we have any record. Even so the force of the general advance in the rate of wages, effective in

December, 1906, and April, 1907, is not fully reflected in the returns for the last fiscal year.

The statement is instructive in showing the effect of the panic of 1893 on railway employment in 1894. There was a decrease of 93,994 in the number of employes, which was not made up until 1898, while another two years elapsed before the number of employes per mile of road rose above the average for 1893.

AVERAGE DAILY COMPENSATION 1892-1907.

The following statement shows the average daily compensation of the several classes of railway employees since 1892—the first year when such statistics are available:

Class	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892
General officers.....	14.10	11.81	11.74	11.61	11.27	11.17	10.97	10.45	10.03	9.73	9.54	9.19	9.01	9.71	7.84	7.62
Other officers.....	6.06	5.82	6.02	6.07	5.76	5.60	5.56	5.22	5.18	5.21	5.12	5.96	5.85	5.75	.....	.....
General office clerks.....	2.30	2.24	2.24	2.22	2.21	2.18	2.19	2.19	2.20	2.25	2.18	2.21	2.19	2.34	2.23	2.20
Station agents.....	2.06	1.94	1.93	1.93	1.87	1.80	1.77	1.75	1.74	1.73	1.73	1.73	1.74	1.75	1.83	1.81
Other station men.....	1.77	1.69	1.71	1.69	1.64	1.61	1.59	1.60	1.60	1.61	1.62	1.62	1.62	1.63	1.65	1.68
Enginemen.....	4.33	4.12	4.12	4.10	4.01	3.84	3.78	3.75	3.72	3.72	3.65	3.65	3.65	3.61	3.66	3.68
Firemen.....	2.56	2.42	2.38	2.35	2.28	2.20	2.16	2.14	2.10	2.09	2.05	2.06	2.05	2.03	2.04	2.07
Conductors.....	4.00	3.51	3.50	3.50	3.38	3.21	3.17	3.17	3.13	3.13	3.07	3.05	3.04	3.04	3.08	3.07
Other trainmen.....	2.77	2.35	2.31	2.27	2.17	2.04	2.00	1.96	1.94	1.95	1.90	1.90	1.90	1.89	1.91	1.89
Machinists.....	2.87	2.69	2.65	2.61	2.50	2.36	2.32	2.30	2.29	2.29	2.23	2.26	2.22	2.21	2.33	2.29
Carpenters.....	2.50	2.28	2.25	2.26	2.19	2.08	2.06	2.04	2.03	2.02	2.01	2.03	2.03	2.02	2.11	2.08
Other shopmen.....	2.06	1.92	1.92	1.91	1.86	1.78	1.75	1.73	1.72	1.70	1.71	1.69	1.70	1.69	1.75	1.71
Section foremen.....	1.88	1.80	1.79	1.78	1.78	1.72	1.71	1.68	1.68	1.69	1.70	1.70	1.70	1.71	1.75	1.76
Other trackmen.....	1.45	1.36	1.32	1.33	1.31	1.25	1.23	1.22	1.18	1.16	1.16	1.17	1.17	1.18	1.22	1.22
Switchmen, flagmen and watchmen.....	1.89	1.80	1.79	1.77	1.76	1.77	1.74	1.80	1.77	1.74	1.72	1.74	1.75	1.75	1.80	1.78
Telegraph operators and dispatchers...	2.27	2.13	2.19	2.15	2.08	2.01	1.98	1.96	1.93	1.92	1.90	1.93	1.98	1.93	1.97	1.93
Employees account, floating equipment	2.26	2.10	2.17	2.17	2.11	2.00	1.97	1.92	1.89	1.89	1.86	1.94	1.91	1.97	1.96	2.07
All other employees and laborers.....	1.92	1.83	1.83	1.82	1.77	1.71	1.69	1.71	1.68	1.67	1.64	1.65	1.65	1.65	.....	1.67

Before directing attention to the significant features of this table, it should be explained that the average pay of general officers in 1907, is out of proportion because the returns cover only 60 per cent of their class, and include all the more important systems. As regards the other classes, the averages are approximately correct, for the returns cover fully 96 per cent of the employees in each class.

Present public interest attaches to this table because it is the first statistical recognition of the great advance in the rate of railway wages made in the fall of 1906 and the winter of 1907. Although the raise in pay was operative less than six months out of the twelve, the average compensation per day, actually worked, increased 5 per cent.

To appreciate what this means it is only necessary to say that applied to the aggregate pay-roll of 1906, an increase of five per cent in the rate accounted for over \$46,500,000 of the aggregate increase, for the year, irrespective of the larger number employed, approximately 154,000. Moreover, an increase in numbers has an invariable effect to diminish the average compensation of all employees.

Going back ten years it appears that there has been an increase in the rate of pay of railway employes of over 20 per cent—the three most numerous classes averaging for “Other trainmen” 45 per cent; “Other shopmen” 20 per cent; and “Other trackmen” 25 per cent. The increases for the four great classes most immediately concerned in the operation of trains were, Engineers 19 per cent, Firemen 25 per cent, Conductors 30 per cent and Other Trainmen 45 per cent.

Glancing back still further, this table shows how the panic of 1893 affected the daily compensation of railway employes. Coincident with a reduction of nearly 94,000 in numbers there was a recession of from 1 to 5 per cent in the average per day, which fails to take cognizance of the curtailment in days worked, or the fact that in times of depression the less efficient classes of labor are the first to suffer, thereby tending to maintain the average scale.

In 1894, the official statistician, commenting on the effect of the business depression on railway employment, found that the decrease per 100 miles of line had been greatest in employes assigned to maintenance of way and structures, 18.54 per cent; next in those assigned to maintenance of equipment, 16.50 per cent; then in general administration, 14.29 per cent; and to conducting transportation, 11.11 per cent. Like conditions are following from the business depression of 1907 and will be reflected in the statements for 1908.

That there has been no increase in the effectiveness of labor through higher compensation is proved by the fact that the labor cost to produce \$1,000 gross earnings in 1907 was \$416 against \$415 in 1897. This, despite the vast sums expended on right of way and equipment to reduce the cost of transportation, presents a phase of the railway problem which has been obscured by the popular agitation for lower fares and restrictive legislation.

RAILWAY WAGES IN GREAT BRITAIN.

Although foreign statistics fail to classify the wages of railway employes with anything approaching the detail of American reports, the following statement published by “The Amalgamated Society of (British) Railway Servants” affords data for comparison:

**STATEMENT OF BRITISH RAILWAY EMPLOYEES RECEIVING WAGES
RANGING FROM \$2.43 TO \$12.18 PER WEEK.**

Rate of Wage per week	Number Employed	Rate of Wage per week	Number Employed
\$12.18	40	\$5.60	16,950
11.69	990	5.36	17,140
10.96	5,540	5.12	20,950
10.23	5,650	4.87	18,990
9.50	3,030	4.63	18,400
8.77	4,040	4.38	19,300
8.53	550	4.14	13,570
8.28	34	3.94	7,220
8.04	6,270	3.65	6,550
7.79	1,710	3.41	4,100
7.55	1,290	3.17	2,780
7.31	8,580	2.92	2,780
7.06	4,720	2.68	1,830
6.82	6,850	2.44	2,180
6.58	10,540	Under 2.44	3,200
6.33	10,210		
6.09	13,350		258,854
5.85	19,520		

These figures are the result of the census of wages, hours of labor, etc., made by the Amalgamated Society of Railway Servants in connection with its recent demands on British railways. The average wages work out \$5.83 per week for men and \$2.86 for boys.

The average rate of British engine drivers is \$9.37 per week, of firemen \$5.78, and of passenger guards \$6.05.

The census of the Amalgamated Society only covers about 44 per cent of the railway employes of the United Kingdom, who, according to the last official poll, taken in 1904, numbered 581,664. As the total compensation of British railway employes in 1906 was approximately \$163,046,000, it would appear that the average per employe was only \$280 per year, or \$5.40 per week, against the average of \$5.83 returned by the Amalgamated Society. The discrepancy is probably due to some large class of low paid workers being excluded from the Society's returns.

PAY OF RAILWAY EMPLOYEES IN GERMANY.

In 1906 there were 648,437 persons employed on the railways of Germany who received a total compensation of \$219,390,932, or about \$338 per employe.

These were divided into four main divisions, which were again divided into salaried officials, officials paid by the day, and laborers. The number and pay of employes in the four divisions were as follows:

NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES, BY PRINCIPAL DIVISIONS.

Division	Employees Number	Compensation (Total)	Average per Year
General administration.....	29,703	\$20,954,195	\$705
Maintenance and guarding road.....	166,155	36,076,972	217
Station service and train crews.	284,598	99,733,256	350
Switching crews and shops.....	167,981	62,626,509	373
	648,437	\$219,390,932	\$337

In the division of maintenance and guarding track 130,758 laborers received an average of \$192 per year.

Such figures prove beyond question that the average pay of railway employes in the United States is about double that of railway servants in Great Britain or Germany.

IV

CAPITALIZATION IN 1907

Returns to this Bureau for the year ending June 30th, show an approximate net capitalization of \$13,064,279,303 for the entire railway system of the United States. This is equivalent to \$57.425 per mile of line or \$39.781 per mile of all tracks.

On June 30, 1907, the par value of the stocks, bonds and other funded obligations of the 345 companies reporting to this Bureau was as follows:

CAPITALIZATION OF 345 COMPANIES. (Operating 212,357 miles.)

Item	Amount Outstanding
Capital Stock.....	\$ 5,776,776,518
Bonds.....	6,730,121,181
Equipment trust obligations.....	246,247,786
	\$12,753,145,485

From this sum should be deducted the value of the securities owned by the operating companies, given in the following statement:

SUMMARY OF STOCKS AND BONDS OWNED BY THE 345 OPERATING COMPANIES.

Item	Par Value	Actual Value
Stocks:		
Railway.....	\$2,343,582,995	\$1,557,287,643
Other.....	326,624,341	213,750,216
Bonds:		
Railway.....	866,020,519	719,359,324
Other.....	131,355,700	109,817,719
	\$3,667,573,555	\$2,600,214,902

Deducting the value of the securities owned from the face of the outstanding securities of the 345 companies, yields a net capital of \$10,152,930,583. As only 165,692 miles of the 212,357 operated by

these companies is definitely covered by this sum, it becomes necessary to add thereto the capitalized rental paid for the 46,665 miles of road operated but not owned by the 345 companies. This provides the items for the following statement of the net capitalization of the roads reporting to this Bureau:

NET CAPITAL 345 ROADS.

Gross capital (as above).....	\$12,753,145,485
Capitalized rental of 46,665 miles of line \$122,852,936 at 5%	2,457,058,720
Total.....	\$15,210,204,205
Less value of securities owned as above.....	2,800,214,902
Net capitalization.....	\$12,609,989,303

Estimating that the 15,143 miles of line not included in reports to this Bureau, largely made up of minor roads, carry a capitalization of \$30,000 per mile, it would add \$454,290,000 to the above and give a total for the United States in 1907 of **\$13,064,279,303.**

RAILWAY CAPITAL IN 1906.

That these figures for 1907 are not far wide of the mark is proved by the following summary from the Official Statistics for the year 1906:

SUMMARY OF RAILWAY CAPITAL, 1906.

Stocks:		
Preferred.....	\$1,400,758,131	
Common.....	5,403,001,962	
Total stocks.....		\$6,803,760,093
Funded debt:		
Bonds.....	\$6,266,770,962	
Miscellaneous obligations.....	973,647,924	
Income bonds.....	301,523,400	
Equipment trust obligations.....	224,719,099	
Total funded debt.....		7,766,661,385
Total stocks and funded debt.....		\$14,570,421,478
Less stocks and bonds owned by railways.....		3,299,894,045
Net capital 1906.....		\$11,270,527,433

It will be perceived that over \$1,000,000,000 of the apparent increase in 1907, is represented in the deduction of the actual value of securities owned that year, whereas in 1906, the official statistics deal only with par values.

How this net capitalization compares with the capitalization or cost of construction of the railways of the principal foreign countries is shown in the following statement compiled from the latest returns:

RAILWAY CAPITALIZATION OF THE PRINCIPAL FOREIGN COUNTRIES.

Year	Country	Miles of Line	Capital or Cost of Construction	Per Mile
Europe:				
1906	United Kingdom.....	23,063	\$6,267,121,872	\$271,739
1906	German Empire.....	34,563	3,613,493,706	104,547
1904	Russia in Europe.....	30,800	2,904,103,000	93,960
1904	France.....	24,755	3,313,980,000	133,871
1905	Austria.....	12,976	1,410,494,449	108,700
1905	Hungary.....	11,259	718,731,640	63,836
1903	Italy.....	10,022	1,114,256,000	111,181
1904	Belgium (state).....	2,483	412,560,000	166,153
1905	Switzerland.....	2,644	275,950,070	104,368
Other Countries:				
1907	Canada.....	22,452	1,254,682,745	55,882
1904	British India.....	27,560	1,182,500,000	42,906
1904	Argentine Republic.....	12,065	567,895,991	47,069
1906	Japan.....	4,783	205,779,517	43,023
1905	Mexico.....	6,503	376,816,625	57,847
1907	New South Wales.....	3,452	217,690,120	63,062
1907	United States	227,500	13,064,279,303	57,425
	United States (all tracks).....	328,400		39,781

The comparisons of this table are conclusive of the amazingly low capitalization of American Railways.

V

OWNERSHIP OF AMERICAN RAILWAYS

No complete statement of the number of stockholders in the railways of the United States has been attempted since the report of the Interstate Commerce Commission to the Senate in February, 1905, and none has ever been attempted as to the ownership of railway bonds, which are more widely held for investment than stocks.

In the report just mentioned, covering 1,182 companies, the Commission found that the number of stockholders of record at the date of the last election of directors prior to June 30, 1904, was 327,851, exclusive of stockholders in 922 roads for which no reports were given.

Of the 345 roads reporting to this Bureau in 1907, 317 returned 241,554 stockholders as of record at the date of the last election of directors prior to June 30th of that year. This showed an increase of 14,568 over the total for practically the same roads in 1906.

Since the date covered by these returns, there has been an enormous extension of railway ownership in small lots so that to-day the number is probably 20 per cent greater than it was a year ago. On January 1, 1908, there were 57,226 shareholders in the Pennsylvania Company alone, showing an increase of 16,370 during the year. Eighteen other companies which reported 68,858 shareholders in 1906 had 83,281 on October 15, 1907, an increase of 14,423, or 21 per cent for the year.

By one of those coincidents that challenge credibility, the same newspapers that on February 13th last, announced that the stockholders of roads in the Pennsylvania system numbered over 77,000 printed an independent item stating that the same system had more than 77,000 idle freight cars on its lines, an idle car for each stockholder.

To-day the ownership of American railways is probably distributed in the hands of over a million investors in their stocks and bonds.

VI

COST OF CONSTRUCTION TO 1907

Receiverships and reorganizations have played such a periodical part in the history of American railways that the cost of their construction is in a great many instances no longer a matter of definite record. In some cases the cost at foreclosure sale is given in lieu of cost of construction, and not infrequently even this information is not vouchsafed.

In the general balance sheet for the year ending June 30, 1906, the Official Statistician publishes the following data covering 208,310 miles of line:

COST OF ROAD AND EQUIPMENT SHOWING INCREASE OVER
PRECEDING YEAR.

Item	Amount 1906	Increase over 1905
Cost of road	\$11,588,922,421	\$353,044,115
Cost of equipment	831,365,517	52,090,996
Total	\$12,420,287,938	\$405,135,111

As by the official showing the equipment was increased by 3,315 locomotives, 1,549 passenger cars and 114,492 freight cars costing at least \$143,000,000, to say nothing of the extra cost of replacements, the inadequacy of the figures on increase of equipment is apparent.

The statement, however, suffices to establish that the cost of 208,310 miles of line approaches the net capitalization for 227,500 miles given above, and exceeds it per mile.

The returns for the 345 roads reporting to this Bureau show the following cost of road and equipment for 212,357 miles of line in 1907, compared with the like data for 206,960 miles in 1906:

ITEM	1907	1906	Increase
Cost of road	\$7,897,897,918	\$5,966,303,567	\$1,931,594,351
Cost of equipment	940,286,193	786,469,647	153,816,551
Undistributed cost of road and equipment	3,090,579,791	3,286,313,826	a 195,734,035
	\$11,928,763,907	\$10,039,087,040	\$1,889,676,867

(a) Decrease.

Generally this statement indicates the greater completeness of the returns to this Bureau for 1907. The decrease noted in the third item is doubtless due to the fuller allocation of cost between road and equipment accounts last year.

If an allowance of only \$25,000 per mile be made for the cost of 15,000 miles of line not reporting to this Bureau, and 46,000 miles operated under lease, \$1,535,000,000 should be added to the above total. This would make the cost of road and equipment of the railways of the United States aggregate approximately **\$13,463,763,907.**

That this is below the actual cost of construction will be admitted by all who consider \$25,000 per mile an entirely inadequate estimate of the cost of the leased roads for which a rental of \$122,852,936 was paid in 1907.

VII

PUBLIC SERVICE OF RAILWAYS

Having in the preceding pages set forth the various items employed in the transportation industry—mileage, equipment, capital and labor, it is next in order to ascertain the public service to which they are devoted. On the efficiency with which this is performed should depend its title to public approval or criticism. That public service is set forth in the following statement in which the returns to this Bureau for 1907 are compared with the final official returns for 1906:

SUMMARY OF PASSENGER SERVICE.

ITEM	1907	1906
Miles of line represented.....	212,357	222,340
Passengers carried.....	822,385,089	797,946,116
Passengers carried one mile.....	27,266,308,000	25,167,240,831
Passenger revenue.....	\$548,082,871	\$510,032,583
Average passenger journey (miles).....	33.15	31.54
Average receipts per passenger mile (cents).....	2.010	2.003
Mileage of revenue passenger trains.....	492,930,683	479,037,553
Average number of passengers in train.....	55	49

SUMMARY OF FREIGHT SERVICE.

ITEM	1907	1906
Number of tons carried.....	1,600,880,269	1,631,374,219
Tons carried one mile.....	236,038,653,000	215,877,551,241
Freight revenue.....	\$1,766,650,449	\$1,640,386,655
Average haul per ton (miles).....	147.44	132.33
Average receipts per ton mile (mills).....	7.48	7.48
Mileage of freight trains.....	619,551,198	594,005,825
Average number of tons in train.....	380.98	344.39

MISCELLANEOUS.

ITEM	1907	1906
Mileage of mixed trains.....	27,609,354	32,833,713
Total revenue train mileage.....	1,140,091,235	1,105,877,091
Ratio of operating expenses to earnings.....	66.99	66.08

Here is proof that in every respect the public service rendered by 212,357 miles of line in 1907 exceeded that rendered by 222,340 miles in 1906. A clear case of where the part is greater than the whole—was a year before.

In the matter of freight tons carried one mile, the excess is especially significant. In a year when the public mind was inflamed over the alleged inadequacy of railroad facilities, those facilities were performing the seemingly impossible feat of carrying at least 25 billion tons more of freight one mile than was carried in 1906. The truly marvelous nature of this achievement becomes apparent when it is recalled that the ton mileage in 1906 itself marked an increase of over 29 billion ton miles, making an increase of 54 billion ton miles, or over 29 per cent, in two years.

The magnitude of this performance can be realized when it is understood that it is almost equal to the entire freight traffic of New York, New Jersey, Pennsylvania, Delaware and Maryland—the Interstate Commerce Commission group having one-quarter of the freight traffic of the United States.

Moreover the great traffic was handled at a rate—7.48 mills per ton mile only—24/100ths of a mill above the lowest level ever touched by this most significant unit.

The shadow of coming events may be traced in the increase in the ratio of expenses to earnings from 66.08 per cent in 1906 to practically 67 per cent in 1907—a ratio which was to exceed 70 per cent for the whole country before the close of the calendar year.

The course of this tell-tale ratio since June 30th last, as disclosed by the monthly reports to the Interstate Commerce Commission, is startlingly shown in the following summary:

RATIO OF EXPENSES TO EARNINGS SINCE JUNE 30, 1907.

Month 1907.	Mileage Represented	Earnings Per Mile.	Ratio Expenses to Earnings
July.....	223,965	1,022	67.2
August.....	224,186	1,079	65.2
September.....	224,333	1,040	67.0
October.....	223,600	1,117	66.8
November.....	223,464	983	70.2
December.....	223,888	863	73.5
1908			
January.....	183,401	770	76.5

Partial reports for February show no change in the trend, despite drastic efforts to reduce expenses. The conditions illustrated in the above statement should be studied in connection with the following table of average freight and passenger receipts and the operating ratio since the official data has been available:

**SUMMARY OF RECEIPTS PER PASSENGER AND TON MILE AND WORK-
ING RATIO 1890 TO 1907.**

Year	Passenger Receipts per Mile (Cents)	Freight Receipts per Ton Mile (Mills)	Per Cent Expenses to Earnings
1907.....	2.010	7.48	(a) 66.99
1906.....	2.003	7.48	66.08
1905.....	1.962	7.66	66.78
1904.....	2.006	7.80	67.79
1903.....	2.006	7.63	66.16
1902.....	1.986	7.57	64.66
1901.....	2.013	7.50	64.86
1900.....	2.003	7.29	64.65
1899.....	1.978	7.24	65.24
1898.....	1.973	7.53	65.58
1897.....	2.022	7.98	67.06
1896.....	2.019	8.06	67.20
1895.....	2.040	8.39	67.48
1894.....	1.986	8.60	68.14
1893.....	2.108	8.79	67.82
1892.....	2.126	8.94	66.67
1891.....	2.142	8.95	66.73
1890.....	2.167	9.41	65.80

(a) In the Commission's preliminary report for 1907 this ratio is given as 67.52.

In order to appreciate the exacting nature of the service of their railways to the American people, it should be remembered that since 1898 they have had to pay on an ascending scale for everything entering into the production of transportation, their one saleable commodity. The last straw came with the stiffening of the money markets of the world against their borrowing additional capital to keep abreast of constantly expanding traffic, under restrictions and regulation yearly becoming more onerous.

The relation of freight rates, from which railways derive 70 per cent of their earnings, to the cost of the principal items entering into the cost of construction and operation is graphically told in the following statement, compiled from official sources:

SUMMARY OF RELATIVE PRICES OF ITEMS IN COST OF RAILWAY
SERVICE, ALSO BANK OF ENGLAND RATE.
AVERAGE PRICE 1890-1907=100.

Year	Fuel	Metals and Imple- ments	Lumber and Building Material	Wages of Employees	Railway Freight Rates	Bank of England Rate	
						Low	High
1890-99.....	100	100	100	100	100	..	..
1890.....	104.7	119.2	111.8	100.9	112.2	3	6
1891.....	102.7	111.7	108.4	101.6	108.7	2½	5
1892.....	101.1	106.0	102.8	102.5	107.0	2	3
1893.....	100.0	100.7	101.9	102.5	104.6	2½	5
1894.....	92.4	90.7	96.3	99.1	102.5	2	3
1895.....	98.1	92.0	94.1	98.3	100.0	2	2
1896.....	104.3	93.7	93.4	98.3	96.1	2	4
1897.....	96.4	86.6	90.4	97.5	95.1	2	4
1898.....	95.4	86.4	95.8	97.5	89.7	2½	4
1899.....	105.0	114.7	105.8	99.1	86.3	3	6
1900.....	120.9	120.5	115.7	102.5	86.9	3	6
1901.....	119.5	111.9	116.7	103.5	89.4	3	5
1902.....	134.3	117.2	118.8	105.0	90.2	3	4
1903.....	149.3	117.6	121.4	110.0	90.9	3	4
1904.....	132.6	109.6	122.7	111.8	92.9	3	4
1905.....	128.8	122.5	127.8	110.9	91.2	2½	4
1906.....	134.0	.....	.....	114.3	89.1	3½	6
1907.....	134.6	.....	.....	121.9	89.1	4	7

It is regrettable that there is no official data to show the average prices of metals and lumber since 1905, but it is common knowledge that their tendency was still upward in 1906 and 1907.

The Bank of England rate is used as the barometer of the money market because it is affected by conditions common to all parts of the globe.

This statement shows that while everything entering into the production of transportation has advanced from 25 per cent to 40 per cent—in the case of capital the advance has been almost 100 per cent—the increase in railway rates has been inappreciable, such increase as there has been being readily accounted for by the shifting in the commodities carried.

COMPARATIVE TONNAGE OF COMMODITIES.

It is so frequently asserted that the low rate per ton mile on American railways is due to what one high official of the Interstate Commerce Commission called "the constant tendency toward an increase in the tonnage of low grade freight," that the following summary of the tonnage of the seven great classes into which commodities are divided by the Commission since records have been kept, will be of interest:

**SUMMARY OF PERCENTAGE OF MOVEMENT OF TONNAGE OF SEVERAL
CLASSES OF COMMODITIES, 1899-1906.**

Year	Low Rate Freight Percentage of Aggregate					High Rate Freight Percentage of Aggregate			
	Products of Agriculture	Animals	Mines	Forest	Total	Manufactures	Merchandise	Miscellaneous	Total
1899.....	11.33	3.12	51.47	10.89	76.81	13.45	4.49	5.25	23.19
1900.....	10.35	2.87	52.59	11.61	77.42	13.41	4.26	4.91	22.58
1901.....	10.76	2.91	51.67	11.67	77.01	13.75	4.16	5.08	22.99
1902.....	9.23	2.64	52.36	11.64	75.87	14.49	4.37	5.27	24.13
1903.....	9.56	2.63	51.56	11.67	75.42	14.39	4.69	5.50	24.58
1904.....	9.59	2.74	51.56	12.53	76.42	13.41	4.83	5.34	23.58
1905.....	9.03	2.54	53.59	11.24	76.40	13.60	4.32	5.68	23.60
1906.....	8.56	2.32	53.09	11.24	75.21	14.81	4.06	5.92	24.79

At a glance it is apparent that the tonnage of high rate freight has been relatively greater than in 1899 every year since, except in 1900 and 1901, and that in 1906 the percentage of high rate tonnage was the highest in the records of the Commission. And yet since 1904 the tendency of receipts per ton mile has been constantly downward.

That the railways continued to prosper under the pressure that produced such results in the face of adverse conditions, economic, industrial and legislative, is a phenomenon that can only be accounted for by phenomenal management. When legislative restrictions began financial mistrust, the situation baffled good management and the sequel is written in an operating ratio running from an average of 70 per cent to over 90 per cent in some instances.

CAR SERVICE OPERATIONS.

No more convenient general test of the efficiency with which American railways are performing their public service could possibly be devised than that afforded by the reports showing the cars handled by the various car-service associations. On the principle that "the shallows murmur, while the deeps are dumb," the whole country was disturbed by the violent murmuring over car shortages in the winter of 1906-7. With the coming of the robins and the breaking up of the snow blockade in the north and the shippers' detention of cars everywhere, car service resumed its normal activity.

During the month of January, 1907, there were fewer cars handled by the 38 car-service associations than in the corresponding month in 1906. This was chiefly due to climatic conditions in some territory and undue detention of cars by shippers elsewhere. But from February first down to the end of October, before the financial panic paralyzed traffic, there was a steady increase in cars handled. Even including January the increase for ten months was over 9 per cent in excess of the corresponding figures for 1906, when the traffic, according to popular apprehension, had exceeded the capacity of the railways.

The following table presents a striking picture of the railway traffic of the country up to the verge of the panic of 1907:

COMPARATIVE STATEMENT OF CARS HANDLED BY CAR-SERVICE
ASSOCIATIONS FOR TEN MONTHS TO OCTOBER 31, 1906
AND 1907.

(Compiled from Monthly Car-Service Association Reports by
the Bureau of Commerce and Labor.)

NAME OF ASSOCIATION.	Ten Months		NAME OF ASSOCIATION	Ten Months	
	1906	1907		1906	1907
	Cars	Cars		Cars	Cars
Alabama.....	616,888	678,614	New York and New Jersey....	894,274	1,185,740
Baltimore and Washington.....	615,328	625,364	North Carolina.....	314,801	345,076
Butte Terminal.....	115,401	106,718	Northeastern Pennsylvania. .	700,632	781,037
Central (New York).....	534,112	623,136	Pacific.....	797,366	982,804
Central (St. Louis).....	753,638	782,904	Pacific Northwest.....	611,482	742,472
Chicago.....	1,863,632	1,941,680	Philadelphia.....	1,834,264	1,998,447
Cincinnati.....	618,593	651,814	Pittsburg.....	2,832,335	2,559,022
Cleveland.....	651,096	844,007	Southeastern.....	726,183	716,133
Colorado.....	374,370	363,840	Southern a.....	246,436	401,535
Columbus.....	367,253	401,866	Tennessee.....	304,184	332,098
Illinois and Iowa.....	2,487,449	2,832,807	Terminal (Minneapolis).....	1,390,551	1,451,824
Indiana.....	793,654	929,167	Texas.....	773,199	820,765
Lake Superior.....	282,458	335,582	Toledo.....	237,363	443,923
Louisville.....	449,592	436,006	Utah.....	126,915	154,601
Memphis.....	206,993	209,473	Virginia.....	721,316	764,559
Michigan.....	621,563	705,277	Western New York.....	721,766	838,106
Missabe Range.....	32,100	36,913	Western (Omaha).....	584,851	652,413
Missouri Valley.....	1,348,288	1,619,220	Wisconsin.....	933,894	948,032
Nashville.....	280,812	299,082			
New England.....	1,653,139	1,679,963	Total reported by 38 associa- tions.....	29,418,171	32,222,020

a Formerly the Louisiana Car-Service Association.

It will be noticed that only four associations—Butte Terminal, Colorado, Louisville and Southeastern—show a decrease for the ten months. In each of these cases the drop was due to local and exceptional influences.

The first symptom of the "traffic shortage" appeared in these car reports in November, when 25,306 fewer cars were handled than in the corresponding month in 1906, and it was unmistakable in December, when the number handled was 471,956 less than in December, 1906—a drop of over 15 per cent.

THE SURPLUS OF FREIGHT CARS.

Where the Commission, in its Twenty-first Annual Report, under date of December 23, 1907, said, "It may be conservatively stated that the inadequacy of transportation facilities is little less than alarming," the records of the American Railway Association for several months past have shown the following total surpluses and shortages of railway cars on the dates named:

	Surpluses	Shortages
February 5.....	343,217	1,085
January 22.....	342,580	738
January 8.....	341,763	653
December 24.....	209,310	724
December 11.....	119,339	4,520
November 27.....	40,348	17,964
October 30.....	3,946	90,757

At this writing a line of track from Chicago to San Francisco would not furnish storage for the empty freight cars for which there is an alarming inadequacy of traffic.

VIII

EARNINGS AND EXPENSES

Now we come to that feature of railway statistics which receives the first attention in Wall Street and is always made the sole subject of the Commission's "Preliminary Report"—the Income Account. Capital and labor, shareholders and employes, investors, economists, legislators and politicians, and above all the great American people, are deeply interested that the earnings of the railways shall be adequate to provide a sufficient surplus, after paying expenses of operation and all just charges for capital, to maintain railway facilities up to the full measure of the service demanded of them. Whatever may be Labor's just share in the cost of operating the railways, whatever may be a reasonable return for the money invested in them, it is essential to the commonweal that the railways shall not be crippled in their public service by underpaid labor or poorly secured capital.

Micawber's formula, "Income, 20 pounds, expenses 19 pound six, result, happiness; expenses 20 pound one, result, misery," is as applicable to American railways with an income of two and one-half billions as to the humblest track walker or switch tender on their lines. Only the scale is different.

Both earnings and expenses have to be scrutinized with increasing vigilance and intelligence. The earnings have been swelled to vast proportions by catering to volume of traffic with the lowest freight rates in the world. The expenses have been kept within bounds by organizing the highest paid labor into the most efficient industrial force in the world.

There is a point beyond which development along both of these lines becomes unremunerative. Whether it has been reached by either or both is not for the writer to say.

In the following statement the returns to this Bureau of the income account for 1907 are given in juxtaposition with what the official statistician says may be accepted as an income account of the railways of the United States, considered as a system, for 1907. "It is such an income account," he states, "as would have resulted from the actual operations had such operations been conducted by a single corporation."

COMPARATIVE INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED
STATES, CONSIDERED AS A SYSTEM, FOR THE YEARS
ENDING JUNE 30, 1907 AND 1906.

ITEM	1907	1906
	Miles represented, 212,357	Miles represented, 222,340
Passenger revenue.....	\$548,082,871	\$510,032,583
Mail.....		47,371,453
Express.....		51,010,930
Other passenger earnings.....		11,314,237
Freight revenue.....	1,766,650,449	1,640,386,655
Other freight earnings.....		5,645,222
Other earnings from operation (see Note a).....	191,729,546	60,004,087
Total.....	\$2,506,462,866	\$2,325,765,167
Operating expenses.....	1,679,265,039	\$1,536,877,271
Salaries and maintenance of leased lines.....		571,431 1,537,448,702
Net earnings from operation..	827,197,827	788,316,465
Income from other sources (see Note b).....	147,158,736	60,520,306
Net earnings and income....	\$974,356,563	\$848,836,771
Deductions:		
Interest on funded debt.....	\$280,904,825	\$305,337,754
Interest on current liabilities..	17,495,175	11,653,076
Rent paid for lease of road (see Note c).....	122,852,936	
Taxes.....	71,273,048	74,785,615
Permanent improvements charged to income ac- count.....	37,509,959	
Interest on real estate mort- gages.....	423,620	
Other deductions.....	59,741,868	
Total.....	\$590,201,431	\$391,776,445
Available for dividends, ad- justments and improve- ments.....	384,155,132	457,060,326
Dividends.....	255,122,093	(d) 213,555,081
Common.....	214,665,149	
Preferred.....	40,172,228	
Other payments.....	284,726	
Available for adjustments and improvements.....	129,033,039	(e) 243,505,245
Deficits in weak lines.....	9,970,185	See Note e

(a) The returns to this Bureau do not separate the earnings from mail, express, etc. The total of \$191,729,546, therefore, should be compared with \$175,345,929, the sum of these items for 1906.

(b) This figure in the official statistics for 1906 represents only "clear income from investments." The gross "income from other sources" that year was \$256,639,591, "which," in the language of the statistician, "swells the gross income to a wholly fictitious figure."

(c) In 1906 the amount paid by operating companies under this head was \$121,623,324, and was evidently deducted from income from other sources. It does not otherwise figure in the income account.

(d) Net dividends.

(e) Official Note.—"This amount comprises the following items: Permanent improvements, \$49,042,631; advances to cover deficits in operation of weak lines (estimated) \$5,000,000; miscellaneous deductions, \$77,127,853; surplus, \$112,334,761."

Except for the duplication concealed in "Income from Other Sources," and intercorporate dividends and rentals, the figures for 1907 more nearly represent a true income account of the operating railways of the United States than the official figures for 1906.

The item for taxes in 1907 is approximately \$10,000,000 below the true figure, as taxes are largely charged against lessor companies and are therefore included in rentals.

The ratio of operating expenses to earnings in 1907, as previously stated, was 66.99 per cent, against 66.08 per cent in 1906. When the full returns are in, this ratio will probably rise slightly above 67.60 per cent.

If we take the items of interest on funded debt and current liabilities, and combine them with those for dividends and rentals, and subtract income from other sources, we arrive at a close approximation of what share of railway earnings goes to capital. This may be tabulated as follows:

ITEM	Amount
Interest on funded debt.....	\$280,904,825
Interest on current liabilities.....	17,495,175
Gross dividends.....	255,122,093
Rent paid for leased lines (less \$10,000,000 taxes).....	112,852,936
Total paid account of capital.....	\$666,375,029
Less income from other sources, including interest and dividends from bonds and stocks owned.....	147,158,736
Net capital charge.....	\$519,216,293

This is equivalent to 4.12 per cent on \$12,609,989,303, the net capitalization of the roads reporting to this Bureau, as given on page 25, in which it may be recalled the rental is capitalized on a 5 per cent basis. This is absolutely all that falls to the share of capital out of the \$2,506,462,866 received by the railways from the public passenger fares, freight rates, mail and express charges.

Capital, therefore, receives approximately 20.7 per cent of the gross earnings of the railway, where Labor receives 41.6 per cent, or twice as large a share.

DISTRIBUTION OF GROSS EARNINGS IN 1906.

Pursuing the inquiry into the distribution of the gross earnings of railways, \$2,325,765,167 in 1906, the official figures afford data for the following summary:

STATEMENT OF DISTRIBUTION OF GROSS EARNINGS IN 1907,
COMPARED WITH PERCENTAGES FOR 1906.

ITEM			
Pay of employees.....	\$930,801,653	40.02	40.34
Fuel for locomotives.....	170,499,133	7.33	7.51
Water, oil and supplies for locomotives.....	19,695,227	.85	.86
Taxes.....	74,785,615	3.22	3.05
Permanent improvements.....	49,042,631	2.11	1.81
Miscellaneous deductions (improvements, etc.).....	77,127,853	3.32	2.56
Deficits in operating weak lines (Note a).....	5,000,000	.22	.24
Material for			
Locomotives, renewals and repairs.....	52,035,000	2.24	2.40
Freight car renewals and repairs.....	59,744,000	2.57	2.45
Passenger car renewals and repairs.....	14,166,000	.61	.77
Bridges.....	17,500,000	.75	.82
Rails.....	19,000,000	.81	.63
Ties (see Note b).....	26,500,000	1.14	1.20
Ballast and repairs to roadway.....	24,500,000	1.05	1.06
Buildings.....	17,000,000	.73	.77
Hire of equipment, car service, etc.....	21,967,908	.94	1.05
Rents for tracks, yards and terminals.....	26,848,580	1.16	1.15
Rents of buildings and other property.....	4,963,862	.22	.23
Train and station supplies.....	33,233,962	1.43	1.49
Shop tools, repairs and renewals.....	10,252,866	.45	.44
Loss and damage.....	21,086,219	.91	.95
Payments for injuries to persons.....	17,466,864	.75	.77
Law expenses.....	6,938,807	.30	.34
Stationery and printing.....	13,603,022	.59	.59
Advertising.....	6,467,954	.28	.24
Outside agencies.....	20,731,859	.90	.95
Insurance.....	7,352,113	.32	.33
Miscellaneous expenses.....	24,960,497	1.07	.96
Interest on bonds and current liabilities.....	316,990,830	13.63	14.67
Dividends.....	213,555,081	9.14	9.04
Surplus earnings.....	21,917,631	.94	.31
Total.....	\$2,325,765,167	100.00	100.00

(a) According to returns to this Bureau, this item in 1906 was \$12,292,750.
(b) According to Forest Service Circular No. 124 of the Department of Agriculture, the value of ties purchased by steam railroads in 1906 was \$44,220,532. The exact division between replacement and new construction is a matter of estimate.

The "surplus earnings" in this table should not be compared with the "surplus from operations," which the Official Statistician works out in his annual report for 1906, for the simple reason that the latter is only made possible by including \$256,639,591, "Income from Other Sources," which swells the total income to the "fictitious figure" he has pronounced it.

DISTRIBUTION IN 1907.

While the returns to this Bureau do not furnish the details given in the foregoing statement, they afford the following information as to a few of its salient features:

ITEM	Amount (212,357 Miles represented)	Per Cent 1907	Per Cent 1906
Pay of employes.....	\$1,043,401,267	41.63	40.02
Taxes (see Note a).....	71,273,048	2.84	3.22
Permanent improvements.....	37,509,959	1.50	2.11
Miscellaneous deductions, improvements.....	59,741,868	2.38	3.32
Deficits in operating weak lines.....	13,294,108	.53	.22
Interest on bonds and current liabilities.....	298,400,000	11.90	13.63
Dividends (see Note b).....	254,837,377	10.16	9.14
Totals.....	\$1,778,457,627	70.94	71.64

(a) Exclusive of taxes paid by lessor companies in 1907.

(b) Inclusive in 1907 of dividends paid from "income from other sources."

This table indicates that, while Labor in 1907 received an increased share of the gross earnings of railways than in 1906, Capital's proportion, as represented in interest and dividends, was less.

IX

TAXES

As noted on the preceding pages, the \$71,273,048 taxes paid by the roads reporting to this Bureau are exclusive of those paid by the lessor non-operating companies. These, together with the taxes paid by the operating roads, not covered by this report, will swell the total for taxes in 1907 to over \$80,000,000.

How this primary fixed charge has more than doubled absolutely, and almost per mile, since 1889, is shown in the following statement:

SUMMARY OF TAXES PAID ANNUALLY AND PER MILE 1889 TO 1907.

Year	Taxes Paid	Taxes per Mile
1907 (212,357 miles represented).....	\$71,273,048	335
1906 Official statistics, final figures.....	74,785,615	336
1905.....	63,474,679	292
1904.....	61,696,354	290
1903.....	57,849,569	281
1902.....	54,465,437	272
1901.....	50,944,372	260
1900.....	48,332,273	250
1899.....	46,337,632	247
1898.....	43,828,224	237
1897.....	43,137,844	235
1896.....	39,970,791	219
1895.....	39,832,433	224
1894.....	38,125,274	216
1893.....	36,514,689	215
1892.....	34,053,495	209
1891.....	33,280,095	206
1890.....	31,207,469	199
1889.....	27,590,394	179

Between 1889 and 1906, as here shown, the taxes of American railways increased from \$27,590,394 to \$74,785,615, or 171 per cent. In the meantime their gross capitalization only increased from \$8,574,046,742 to \$14,570,421,478, or 70 per cent.

The disparity proves that the assessors have not been over lenient toward the railways.

X.

RAILWAY ACCIDENTS.

Viewing at once the speed, the certainty and the safety with which the intricate movement of modern life is carried on, there is no more creditable monument to human care, human skill and human foresight than the statistics of railroad accidents.

—CHARLES FRANCIS ADAMS, JR.

According to Accident Bulletin No. 24 of the Interstate Commerce Commission, the number of passengers and employes killed and injured on the railways of the United States during the year ending June 30, 1907, was as follows:

	Killed	Injured
Passengers:		
From accidents to trains.....	410	9,070
By accidents from other causes.....	237	4,527
Employes:		
From accidents to trains.....	1,011	8,924
By accidents from other causes.....	3,342	53,765
Total all classes.....	5,000	76,286

This table is constructed after the British system of making the essential and instructive distinction between "train accidents" and those due to "other causes" incident to any industry dealing with enormous factors.

It will be perceived that less than 30 per cent of the fatalities and less than 24 per cent of the injuries are due to accidents to trains.

The casualties to passengers are improperly swelled by including 77 killed and 1,347 injured, who, as postal clerks, express messengers, employes on Pullman cars, newsboys, live stock tenders and men in charge of freight, should be classed as employes and not as passengers.

The Commission makes the following classification of the casualties given in the above table:

Class of Accident	Passengers		Employees	
	Killed	Injured	Killed	Injured
Collisions.....	209	4,733	567	4,808
Derailments.....	185	4,184	330	2,511
Miscellaneous train accidents, including boiler explosions.....	16	153	114	1,605
Total train accidents.....	410	9,070	1,011	8,924
Coupling or uncoupling.....			302	3,948
While doing other work about trains or while attending to switches.....			310	17,711
Coming in contact with overhead bridges, structures at side of track, etc.....	8	44	134	1,591
Falling from cars or engines or while getting on or off.....	162	2,113	790	12,565
Other causes.....	67	2,370	1,806	17,950
Total (other than train accidents).....	237	4,527	3,342	53,765
Total all classes.....	647	13,597	4,353	62,689

Disregarding the figures as to injuries, which cover casualties from the hither side of fatal to those so slight as not to prevent the employe from performing his accustomed service for more than three days out of the ten next following the accident, it is noteworthy that no less than 56 per cent of the fatalities covered in the above table are classed under "Falling from cars or engines, or while getting on or off" and the undefined "other causes" unconnected with "accidents to trains."

It is further well to note that less than 16 per cent of all the fatalities were due to accidents to trains which under any circumstances could have been prevented by a block signal system absolutely precluding the possibility of collisions. This in a year stigmatized by the Commission as the most disastrous in the annals of railroad traffic, fails to indicate the block system as the most comprehensive remedy for the accident record. The total casualties from collisions could be expunged from the record, and the remainder by virtue of their alarming aggregate would still cause "world-wide reproach," wherever the relation of accidents to the unparalleled units of risk involved in the traffic, is ignored.

In 1889, when the Commission's statistics first assumed comparable shape, there were 107 fatalities to passengers in collisions reported against a passenger mileage of 11,553,820,445, or one per 108 million passenger miles. In 1907, with a passenger mileage of approximately 28,000,000,000, the number of passengers killed in collisions was 209, or one per 134 million passenger miles.

Moreover, between 1889 and 1907 the freight traffic of American railways increased nearly fourfold and the number of employes has more than doubled.

In the United States, as distinguished from European countries, the characteristic and preponderating function of the railways is their freight traffic.

What part this plays in darkening the accident record is shown in the following analysis of the 112 "prominent" collisions reported in the Commission's quarterly Accident Bulletins during the year ending June 30, 1907:

Class of Train in Collision	Number of Collisions	Killed	Injured
Passenger and passenger.....	10	19	270
Freight and passenger.....	44	224	981
Freight and freight.....	58	81	197
Total.....	112	324	1,438

Here it appears that freight trains participated in 91 per cent of the "prominent" collisions of the year and shared in responsibility for 305 out of the 324 fatalities or 94 per cent. It is worthy of note that during the last quarter included in the above table no collision between two passenger trains was reported among the "prominent" accidents.

From the brief notes commenting on these prominent accidents, it appears that no less than 22, resulting in 82 fatalities, were directly due to disregard or failure of block signals.

ACCIDENTS TO OTHER PERSONS.

The Commission's Accident Bulletins do not take cognizance of casualties to "Other Persons," although these contributed over 60 per cent of the fatalities charged against the railways. Returns to this Bureau for 1907, however, show the following casualties to persons, other than passengers and employes, during that year:

CLASS	Killed	Injured
Trespassers (including suicides).....	5,256	5,229
Not trespassing.....	940	3,137
Total other persons.....	6,196	8,366

From which it may be estimated that the total number of trespassers and other persons killed in railway accidents in the United States in 1907 was 6,591 and injured 8,900.

KILLED IN RAILWAY ACCIDENTS.

This estimate enables us to complete the following summary of fatalities in railway accidents during the entire period covered by reports to the Interstate Commerce Commission:

SUMMARY OF PASSENGERS, EMPLOYES, TRESPASSERS AND OTHER PERSONS KILLED IN RAILWAY ACCIDENTS FROM 1888 TO 1907.

Year	Passengers	Employees	Trespassers	Other Persons	Total
1907.....	647	4,353	5,591	1,000	11,591
1906.....	359	3,929	5,381	949	10,618
1905.....	537	3,361	4,865	940	9,703
1904.....	441	3,632	5,105	868	10,046
1903.....	355	3,606	5,000	879	9,840
1902.....	345	2,969	4,403	871	8,588
1901.....	282	2,675	4,601	897	8,455
1900.....	249	2,550	4,346	660	7,865
1899.....	239	2,210	4,040	634	7,123
1898.....	221	1,958	4,063	617	6,859
1897.....	222	1,693	3,919	603	6,437
1896.....	181	1,861	3,811	595	6,448
1895.....	170	1,811	3,631	524	6,136
1894.....	324	1,823	3,720	580	6,447
1893.....	299	2,727	3,673	647	7,346
1892.....	376	2,554	3,603	614	7,147
1891.....	293	2,660	3,465	611	7,029
1890.....	286	2,451	3,062	536	6,335
1889.....	310	1,972	Not	*3,541	5,823
1888.....	315	2,070	given	*2,897	5,282

*Includes trespassers.

Between 1888 and 1907, the fatalities to passengers show an increase of 105 per cent, to employees 110 per cent, and to other persons 127 per cent.

During the same period the single track mileage increased 66 per cent; auxiliary tracks 98 per cent; passenger mileage 181 per cent; freight ton mileage 296 per cent, and number of employees 156 per cent.

The increase in the units of risk represented in the last three percentages is the true standard by which to measure the relative increase in railway accidents during the last twenty years. These demonstrate beyond question that railway accidents have decreased relatively to railway traffic.

But the number of accidents, in their very nature, fluctuates so widely from year to year that their general trend can only be judged by comparing groups of years when similar traffic conditions prevail. For such comparison the five years of railway prosperity preceding the panics of 1893 and 1907 afford the following valuable data:

INCREASE IN ACCIDENTS, TRAFFIC AND EMPLOYES BETWEEN FIVE-YEAR PERIODS ENDING JUNE 30, 1892 AND JUNE 30, 1907.

	Average for Five Years		Increase	Increase per Cent
	To June 30, 1892	To June 30, 1907		
Accident Units:				
Fatalities to passengers.....	316	469	151	48
Fatalities to employes.....	2,341	3,776	1,435	61
Fatalities to other persons.....	3,666	6,117	2,451	67
Traffic Units:				
Passenger mileage (millions)....	12,199	23,361	11,062	91
Freight ton mileage (millions)...	76,595	198,017	121,422	158
Number of employes.....	743,949	1,427,441	683,492	92

Here is convincing proof that, despite the harrowing aggregates given publicity from Washington five times a year, there has been a decrease of practically 50 per cent in railway fatalities relatively to the units employed in railway traffic for the periods compared.

It is no answer to this showing that a comparison with the five years ending June 30, 1897, would yield a somewhat different result. Railway accidents rise and fall with the advance and decline of traffic just as surely as the mercury follows the rise and fall of temperature, and for as obvious reasons. The strain is taken off the organization at every point. Efficiency increases in every department. Equipment is kept in better repair. Stricter discipline—the key to all railway efficiency, as well as safety—becomes practicable. The compulsory recruiting of inexperienced men into the service at the rate of 100,000 a year ceases.

All this is what happened in the business recession of 1893, and it will recur under like conditions, unless all lessons of railway experience throughout the world are at fault.

FATALITIES TO EMPLOYEES.

Although in accident fatalities to railway employes the year 1907 was the most disastrous on record, in proportion to numbers employed the showing is far less discouraging, as the following statement shows:

**SUMMARY OF FATALITIES TO EMPLOYEES RELATIVELY TO NUMBER
EMPLOYED AND TRAFFIC MILEAGE.**

Year	Number of Employees	Employees Killed	Number to One Killed	Traffic Handled	
				Passengers One Mile (Millions)	Tons of Freight One Mile (Millions)
1907.....	1,690,000	4,353	388	28,400	246,000
1906.....	1,521,355	3,929	387	25,167	215,877
1905.....	1,382,196	3,361	411	23,800	186,463
1904.....	1,296,121	3,632	357	21,923	174,522
1903.....	1,312,537	3,606	364	20,915	173,221
1902.....	1,189,315	2,969	401	19,689	157,289
1901.....	1,071,169	2,675	400	17,353	147,077
1900.....	1,017,653	2,550	399	16,038	141,596
1899.....	928,924	2,210	420	14,591	123,667
1898.....	874,558	1,958	447	13,379	114,077
1897.....	823,476	1,693	463	12,256	95,139
1896.....	826,620	1,861	444	13,049	95,328
1895.....	785,034	1,811	433	12,188	85,277
1894.....	779,608	1,823	428	14,289	80,335
1893.....	873,602	2,727	320	14,229	93,588
1892.....	821,415	2,554	322	13,362	88,241
1891.....	784,285	2,660	293	12,844	81,073
1890.....	749,301	2,451	306	11,847	76,207
1889.....	704,743	1,972	357	11,553	68,727
1888.....	652,500	2,070	315	11,000	62,000

This is a most illuminating statement in that it shows that under similar traffic conditions, relatively to numbers employed, there has been no increase in fatalities in railway accidents. On the contrary where the traffic conditions have approached similarity, as in 1892 and 1907, there has been a most gratifying decrease in such fatalities relatively to numbers employed. When the traffic handled in these two years is compared, the favorable character of the comparison is still more striking.

**REMARKABLE IMMUNITY FROM ACCIDENT ON A LARGE PROPORTION
OF ROADS.**

The truly adventitious nature of railway accidents is as strikingly illustrated in the immunity from fatalities on a large proportion of our roads, as in the records of those upon which the fatal disasters have occurred. For three years this Bureau has summarized the returns of roads which have reported no fatalities to passengers in train accidents. From these the following statement has been prepared:

**ROADS ON WHICH NO PASSENGER WAS KILLED IN A TRAIN ACCIDENT
IN THE YEARS ENDING JUNE 30, 1907, 1906 AND 1905.**

	1907	1906	1905
Number of operating companies..	300	279	104
Mileage of these companies.....	97,340	119,462	104,596
Passengers carried.....	313,846,272	398,484,008	362,795,534
Passengers carried one mile.....	10,256,862,000	12,414,934,000	10,909,856,254
Tons of freight carried.....	825,185,376	821,095,268	372,214,167
Tons of freight carried one mile..	93,718,688,000	104,934,118,000	47,535,935,531
Passengers killed in train accidents	NONE	NONE	NONE
Passengers injured in train accidents.....	2,107	2,533	1,683

Here we have 300 American railways in 1907, with a single track mileage more than four times that of the United Kingdom, with about the same passenger mileage and with eight times the freight tonnage, operating a twelvemonth without a single passenger killed in a train accident.

The remaining roads operated under practically identical conditions as to construction, equipment and traffic; protected on the average with like apparatus and regulations; with no appreciable difference in the intelligence, experience and devotion of their employes, were so unfortunate as to be responsible for the 410 passengers killed in train accidents.

Moreover, the returns for three years show that within broad lines nearly half the railway mileage of the United States is operated every year with a degree of immunity from fatalities in train accidents which, considering the opportunities for such casualties, is nothing short of marvelous.

Besides the roads enjoying such exceptional immunity, the following summary gives the figures for 16 other companies which during the same year had each only one passenger killed in train accidents:

**ROADS ON WHICH ONLY ONE PASSENGER WAS KILLED IN A TRAIN
ACCIDENT DURING THE YEARS ENDING JUNE 30, 1907, 1906 AND
1905.**

	1907	1906	1905
Number of operating companies..	16	12	13
Mileage of these companies.....	33,448	31,141	33,268
Passengers carried.....	156,526,665	111,394,935	113,685,234
Passengers carried one mile.....	5,268,847,000	4,018,143,000	4,688,312,231
Tons of freight carried.....	227,630,779	162,170,924	131,053,807
Tons of freight carried one mile..	41,865,291,000	33,498,652,000	25,678,085,628
Passengers killed in train accidents	SIXTEEN	TWELVE	THIRTEEN
Passengers injured in train accidents.....	1,020	1,170	927

Certain critics of American railways have asked why, when so many roads are able to show such clear records, all cannot attain like immunity? Statistics cannot search out the root of this matter. They cannot explain why sixteen roads on which there were as many as 1,010 passengers injured in train accidents should have had just 16 in which there were fatalities. They cannot unravel the marvel that 300 other roads having 2,107 passengers injured in train accidents should have carried over 313,846,272 passengers without a single fatality through a like cause.

Many miracles of old were no greater than these. Time and chance, says the preacher, happeneth to all. "Two men shall be in the field; the one shall be taken and the other left."

THE CAUSES OF RAILWAY ACCIDENTS.

There is one thing, however, statistics of railway accidents can do—locate their chief causes. But this demands something besides the mere gathering of the barren numerals of killed and injured, and classifying them as due to collisions, derailments or other causes. The true question is, what caused the collision, derailment or other form of disaster?

For more than thirty years all intelligent students of the subject have recognized the necessity for an official investigation of important railway accidents. In his "Notes on Railway Accidents," published in 1879, Charles Francis Adams, Jr., then a member of the Massachusetts Railroad Commission, comparing the difference in treatment of two similar accidents in the United States and England, wrote:

"The English accident did, however, establish one thing if nothing else; it showed the immeasurable superiority of the system of investigation pursued in the case of railroad accidents in England over that pursued in this country. There a trained expert after the occurrence of such a disaster visits the spot and sifts the affair to the very bottom, locating responsibility and pointing out distinctly the measures necessary to guard against its repetition. Here the case ordinarily goes to a coroner's jury, the finding of which, as a rule, admirably sustains the ancient reputation of that august tribunal. It is absolutely sad to follow the course of these investigations, they are conducted with such an entire disregard of method and lead to such inadequate conclusions. Indeed, how could it be otherwise? The same man never investigates two accidents, and, for the one investigation he does make, he is competent only in his own esteem."

In the generation since these true words were printed we have made not a single step forward toward an intelligent, instructive system of investigating railway accidents. Congress, legislators and commissions have been busy prescribing patent and automatic palliatives without taking the steps necessary to locate the seat of the trouble.

With true American proneness to rely on some sort of a contrivance to circumvent difficulties, Mr. Adams' little volume was printed in hopes that it would hasten the general adoption of four appliances—"the Miller Platform and Buffer, the Westinghouse Brake and the Interlocking and Electric Signal Systems." These are all ancient history now, and American railways, so far as such devices are concerned, have progressed leagues along the patentable path to safety.

But in the matter of investigating accidents, we are still in the "crown's quest" age. And so it comes that if we would know the causes of railway accidents in the United States we have to go to the reports of Lt. Col. H. A. Yorke and his associate inspectors, who are the worthy successors to all the information and experience collected by the British Board of Trade on the subject since Sir Henry Tyler conducted the investigations, to which Mr. Adams pays such merited tribute.

BRITISH RAILWAY ACCIDENTS.

Because of the light they throw upon the causes of railway accidents the world over, let us take a brief survey of British accidents as seen through the reports of the trained investigators to the Board of Trade.

For the year ending December 31, 1906, British roads reported a larger number of fatalities to passengers in train accidents than in any year since 1889, when 80 were killed and 262 injured in a collision near Armagh. These reports show the following totals:

**PERSONS KILLED AND INJURED ON BRITISH RAILWAYS DURING THE
CALENDAR YEAR 1906.**

	Killed	Injured
A Passengers:		
From accidents to trains, rolling stock, permanent way, etc..	58	631
By accidents from other causes incident to the movement of trains.....	108	1,949
By accidents on railway premises not connected with movement of trains.....	8	797
Total passengers.....	174	3,377
B Employees:		
From accidents to trains, rolling stock, permanent way, etc..	13	140
By accidents from other causes incident to the movement of trains.....	425	4,225
By accidents on railway premises not connected with movement of trains.....	45	11,891
Total employees.....	483	16,256
C Other Persons:		
From accidents to trains, etc.....	1	3
Persons passing over railways at level crossings.....	76	24
Trespassers, including suicides.....	455	106
Persons on business at stations.....	33	134
By accidents not connected with movement of trains.....	30	544
Total other persons.....	595	811
Total all classes.....	1,252	20,424

Of the 58 deaths of passengers in train accidents, 56 were attributable to the three accidents at Salisbury, Grantham and Elliott Junction. In accounting for the increase in the number of fatal and non-fatal accidents to employees, the official report says: "It is probable that the increase is largely due to the exceptional activity in goods traffic, and the consequent high pressure at which all railway work had to be conducted during the year 1906." The same causes produced the same results in Great Britain as followed like causes in the United States, emphasized here by a pressure of "goods traffic" many fold greater than has ever existed there. American freight traffic exceeds the British by more than 20 ton miles to one.

Inquiries were held into the causes of 35 train accidents, resulting in locating them as follows—more than one cause contributing to some of the accidents:

Failure of couplings.....	3
Defective maintenance of road or works.....	2
Defective construction of rolling stock.....	2
Defective construction of road or works.....	1
Insufficient brake power.....	1
Insufficient or inadequately enforced regulations.....	4
Defective system of signalling.....	1
Negligence, want of care, and mistakes on the part of servants of railway companies.....	25
Excessive speed, having regard to engine, road or other circumstances.....	8
Foggy weather.....	4
Other or doubtful causes.....	6

This table indicates without comment the chief source of railway accidents.

During the year 1906, the Assistant and Sub-Inspectors of Railways held 832 inquiries into accidents other than train accidents, and the following table shows the causes as found by the officials, and also in those cases where no formal inquiry was held:

CAUSES.	In-quired into	Not in-quired into	Total
A Misadventure or accidental.....	130	2,544	2,674
B Want of caution or misconduct on the part of injured person.....	356	1,141	1,497
C Want of caution or breach of rules on the part of employes other than injured person.....	195	97	292
D Defective system of working, dangerous places and conditions of work.....	81	16	97
E Defective apparatus, want of appliances or safeguards, etc.....	55	93	148
F Neglect or non-observance of Rules under Prevention of Accidents Act.....	15	6	21
All Causes.....	832	3,897	4,729

Commenting on this table, the Chief of the Railway Department of the Board says: "It will be observed that the accidents comprised under the first three headings, which so far as they are affected by rules, etc., may be called unpreventable, outnumber the preventable by nearly 18 to 1."

If we had equally intelligent and unprejudiced inquiry into railway accidents in this country, a like conclusion would be arrived at and we should be in a position to seek a remedy for the preventable accidents.

AS TO OVERWORK.

English statistics confirm the experience of railway officials the world over that investigation "does not show any close connection between long hours and accidents." I quote the words of one of the highest authorities on the subject.

In their findings the British inspectors make it a rule to give the hours the employe responsible for the accident was booked, and "How long on duty at time of accident." I have examined the reports for the three years ending June 30, 1907, to ascertain as near as possible the hours of employment when accidents were most likely to happen. The result is set forth in the following summary, which gives the yearly totals for 1905 and 1906, and by quarters for 1907:

HOW LONG ON DUTY AT TIME OF ACCIDENT.

Three Month to	Off Duty	Hours on Duty when Accident Occurred.																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Sept. 30, 1906.....	14	21	20	15	20	14	17	11	17	14	8	7	2	2	1	1	0	
Dec. 31, 1906.....	1	15	23	14	20	20	21	15	10	13	9	10	11	8	4	0	2	1*
March 31, 1907.....	24	31	21	21	16	15	13	13	23	24	11	10	4	4	4	0	0	
June 30, 1907.....	17	11	23	22	15	14	14	14	15	14	7	0	2	0	0	0	0	
Year 1907.....	1	70	86	78	78	71	64	59	48	68	62	43	35	14	12	5	3	1
Year 1906.....	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	.....	2
Year 1905.....	3	52	74	65	54	71	66	59	48	53	56	41	37	7	3	3	.....	1
Three years.....	10	174	224	213	218	205	211	186	166	192	179	126	111	28	19	11	3	4

*21st hour.

Although attention is called in several instances to the excessive hours some of these men had been working at the time of the accident, *in not one was the accident attributed to the long hours.*

In the case where the accident occurred in the 21st hour, the victim was engaged making extensive necessary signal repairs. When kneeling to adjust a point rod, he knelt on a nail that pierced his knee which caused an injury from which he was laid off duty seven weeks. The inspector found "In this case the mishap must be attributed to want of caution, but at the same time it should be noticed that Mitchell had been on duty for such long hours that he could not be so alert as he otherwise might have been." But there is nothing to indicate that Mitchell *might not* have knelt on the nail at any hour of the 18 he was actually on duty.

As over 40 per cent of British railway employes are booked for 12 hours, the above table amounts to a demonstration that long hours have little or no connection with accidents. It completely explodes the excuses made for legislative interference with the hours of railway labor, so far as this is based on overwork as an appreciable cause of railway accidents. If the British inquiries teach anything, it is that accidents are most liable to happen during the second hour

of employment, which is only another way of saying that there are more men employed during that hour.

This deduction from English statistics is corroborated by the statement made by Dr. Schulz, President of the Railroad Bureau, to the Diet of the German Empire that the accident statistics showed that much the larger number of accidents occurred, not in the later hours of the employes' days' service, as would be the case if due to over fatigue, but in the earlier hours, when the men were fresh.

RAILWAY ACCIDENTS IN EUROPE.

Excluding the returns of injured, because there is no international standard of what constitutes a reportable injury, the figures of railway fatalities in Europe from the latest official sources are as follows:

KILLED IN EUROPEAN RAILWAY ACCIDENTS.

COUNTRY.	Passengers	Employees	Other Persons	Total
United Kingdom (1906).....	174	483	595	1,252
Russia, in Europe (1904).....	a126	446	1,060	1,632
Germany (1906).....	118	716	623	1,457
France (1904).....	18b	226	577	821
Austria (1905).....	15	86	89	190
Hungary (1905).....	12	75	152	239
Italy (1902).....	8	83	63	154
Spain (1903).....	57	40	115	212
Portugal (1904).....			55c	55
Sweden (1904).....	5	36	53	94
Norway (1906).....	1	3	1	5
Denmark (1905-6).....	2		19d	21
Belgium (1905).....	6	46	55	107
Holland (1905).....	6	33	23	62
Switzerland (1905).....	9	30	36	75
Roumania (1904-5).....	3	16	37	56
	560	2,319	3,553	6,432

a Exclusive of local lines and Railways in Finland.

b Train accidents only. Other accidents to passengers included under "Other Persons."

c Including passengers and employes.

d Including employes. Statistics cover state railways only.

Compared with the totals for the United States in 1898, when the mileage and traffic of European and American railways were more nearly on a par than now, the showing is favorable to the safety of American railway passengers and employes. Moreover, it is by no means certain that outside of Great Britain and Germany the reports of railway accidents are anything like as exhaustive as ours in recent years.

RAILWAY ACCIDENTS IN GERMANY.

In Germany, where the railways are state institutions, the authorities are very careful to distinguish between those casualties which are undeserved (unverschuldet) and those which are the result of the victim's own imprudence (unvorsichtigkeit). In Germany a person whether passenger, employe or trespasser cannot be in the wrong place through inadvertence, lack of caution, or transgression of rules, at the wrong time, and hold the government responsible for any mischance that befalls him.

This distinction is carefully preserved in the official statistics of accidents, which, however, exclude accidents in railway workshops, as the following statement shows:

	1906		1907	
	Killed	Injured	Killed	Injured
Passengers:				
In accidents to trains.....	5	352	19	279
Other Accidents:				
Without fault of their own.....	3	75	9	60
As result of their own carelessness.....	110	170	91	159
Total passengers.....	118	597	119	498
Employes on duty:				
In train accidents.....	38	251	39	279
In other accidents:				
Through their own carelessness in trains or cars in motion.....	88	296	79	239
In making up trains.....	89	282	71	268
In coupling cars.....	106	224	97	209
While on tracks in way of moving cars or trains.....	312	249	226	200
Through other forms of carelessness.....	70	211	89	243
Total employes on duty.....	703	1,513	601	1,438
Other officials.....	13	100	12	59
Trespassers, including employes not on duty.....	347	273	370	271
Suicides.....	276	26	283	11
Total.....	1,457	2,509	1,385	2,277

Were American statistics of railway accidents confined to those occurring in connection with the movement of trains, engines and cars, as in Germany, it would reduce the list of killed materially, and exclude more than one-third of the injured from the sensational totals.

If railway managers had no other motive than the one popularly deemed the only one that appeals to corporations, they would find in the annual charge accidents impose upon their earnings an ever

pressing incentive to the exercise of every precaution for the prevention of accidents. During the years 1905 and 1906, misadventure or somebody's carelessness entailed the following expense on the railways:

	1906	1905
Loss and damage.....	\$21,086,219	\$19,782,692
Injuries to persons.....	17,466,864	16,034,727
Clearing wrecks.....	4,601,240	3,594,658
Total.....	\$43,154,323	\$39,412,077

If the railways received effective aid from courts, legislatures and commissions in checking the imprudence and recklessness of the public as well as employes in and about railway premises, there would be an immediate decrease of railway accidents. But instead of statutes to prevent liability to accidents we have legislation tending to relieve the careless, indifferent and reckless from liability for accidents to which they have contributed by their want of care, inattention and often criminal negligence. To exclude from railway service all thought that, in some degree at least, each employe is "his brother's keeper" is to put a premium on the recklessness that is responsible for a large majority of the accidents.

XI

ACCIDENTS ON CANADIAN RAILWAYS.

During the year 1907, the Canadian record of railway accidents was kept with greater regard to details than ever before, and from it the following facts appear:

Class of Accident.	Passengers.		Employees.	
	Killed	Injured	Killed	Injured
Collisions	26	93	46	135
Derailments.....	21	127	12	56
Miscellaneous train accidents.....		3	3	22
Total train accidents.....	47	223	61	213
Coupling or uncoupling.....			34	141
While doing other work about trains or while attending switches.....			85	130
Coming in contact with overhead bridges, structures at side of track, etc.			2	13
Falling from cars or engines, or while getting on or off.	12	74	39	252
Other causes.....	11	55	28	377
Total (other than train accidents).....	23	129	188	913
Total all classes.....	70	352	249	1,126

To these should be added Trespassers 195 killed, 125 injured; other persons 70 killed, 88 injured; and postal clerks, etc., 3 killed, 7 injured—making a grand total of 587 killed and 1,698 injured, on one-tenth the mileage of line with one-fourteenth the passenger mileage and one-twentieth the freight ton mileage carried by the railways of the United States.

Commenting on what can be done to secure greater safety of Canadian railway travel, the official report says: "Back of all measures would lie the human element. To somebody's mistake each mishap is due. Recently it has been the policy of the Crown to take criminal proceedings against railway employes concerned in fatal accidents, and a number of convictions were recorded during the year. It remains to be seen whether or not greater care can be developed by such means."

XII—STATISTICS OF

Herewith is presented a table showing the mileage and other and several other countries for the years specified. It is a subject could be desired, being particularly illusive in the matter of passenger for the more important divisions to permit of general deductions. date six months later than those of the Interstate Commerce Com-

Year	Country	Miles of Line	Capital or Cost of Construction	Receipts from Passenger Traffic	Receipts from Freight Traffic	Receipts from other Sources	Total Receipts
1906	United Kingdom.	23,063	\$6,267,121,872	\$242,929,119	\$284,379,836	\$43,591,068	\$570,900,023
1904	Russia in Europe.	30,800	2,904,103,000	57,155,210	239,052,000	29,363,495	325,570,705
1906	German Empire.	34,563	3,613,493,706	170,165,002	397,580,738	64,232,251	631,977,991
1904	France.	24,755	3,313,980,000	132,414,010	155,287,753	4,640,178	292,341,942
1905	Austria.	12,976	1,410,494,049	36,242,592	104,679,037	5,442,369	146,363,998
1905	Hungary.	11,259	718,731,640	17,474,200	46,164,600	2,507,600	66,140,400
1903	Italy.	10,022	1,114,256,000	25,951,544	38,451,919	3,119,982	69,523,446
1903	Spain.	8,559	566,216,000				56,606,900
1904	Sweden.	7,708	244,936,170	9,615,809	18,310,054	560,360	28,486,223
1906	Norway.	1,575	58,977,720	1,979,412	2,619,626	92,458	4,691,497
1906	Denmark (State only)	1,164	56,248,500	4,624,965	4,762,240	733,440	10,120,646
1905	Belgium.	2,844	479,247,388	17,419,298	35,261,307	1,045,718	53,726,323
1905	Holland.	2,100	173,849,000	10,128,800	9,782,009	1,109,600	21,064,400
1905	Switzerland.	2,644	275,950,070	14,101,811	17,409,914	1,551,908	33,063,634
1905	Portugal.	1,425	162,385,280	4,014,196	5,322,875	423,936	9,761,007
1904	Roumania.	1,974	150,579,877	3,754,660	7,463,931	393,234	11,611,826
1907	Canada Co.'s	20,660	1,171,937,808	45,730,652	95,738,214	5,269,348	146,738,214
	Canada Gov't.	1,792	82,744,937	62,062,387	4,163,783	283,015	66,509,186
1904	Argentina.	12,065	567,895,991	12,421,875	42,254,435	5,693,873	60,370,183
1906	Japan.	4,783	205,779,517	17,065,811	14,349,753	3,101,018	34,516,564
1907	New South Wales.	3,452	217,690,120	7,244,991	14,235,234	1,454,577	22,934,802
	Total.	220,183	\$23,756,618,645	\$832,496,344	\$1,537,269,249	\$174,609,338	\$2,603,039,910
1906	United States.	222,340	13,064,279,303	510,032,583	1,640,386,655	175,345,929	\$2,325,765,167

(a) These average mileage figures are from the compilation of J. D. Diacomidis, Engineer of the Egyptian

(b) Revenue accounts Canadian government railways cover nine months only, to March 31, 1907.

(c) Estimated.

*Note.—The mileage in this table does not agree with that credited elsewhere to *Archiv für Eisen-*

The showing of this comprehensive statement should be a source a capital outlay only slightly more than half that of the systems their service than the leading countries of the world combined.

To the student, this table furnishes the data by which he can freight service in the different countries but close approximations as

If European freight rates had been applied to American traffic of over \$1,400,000,000—provided the traffic had moved. It is in ways have deserved most at the hands of the American people.

FOREIGN RAILWAYS.

salient statistics of the railways of the principal divisions of Europe for regret that the information in all cases is not so complete as for journey and freight haul. It is sufficiently accurate, however, The official figures for Great Britain and Germany are complete to a mission, while those for Canada and Japan are still more up to date.

Total Expenses	Ratio Expenses to Receipts	Passengers Carried	Mean Journey (Miles)	Tons of Freight Carried	Mean Haul (Miles)	Country
\$354,447,628	62.09	1,240,347,000	7.95	488,790,683	24.86	United Kingdom....
213,315,450	65.40	123,208,000	68.58	170,039,234	152.49	Russia in Europe....
408,188,867	64.55	1,209,224,072	14.21	479,226,874	62.48	German Empire....
151,887,720	51.90	433,912,983	19.59	130,143,810	78.86	France.....
97,962,021	66.91	189,931,211	23.00*	133,764,959	65.00*	Austria.....
40,612,800	61.40	86,485,000	25.00*	51,948,000	83.00*	Hungary.....
50,292,540	72.30	68,031,232	27.00*	23,688,410	66.00*	Italy.....
27,792,000	49.10	39,600,000	34.00*			Spain.....
18,867,769	66.22	39,354,777	16.47	27,624,444	44.64	Sweden.....
3,457,627	73.71	10,074,372	15.37	4,273,189	34.10	Norway.....
7,863,383	77.70	19,467,616	21.00*	4,530,833	53.00*	Denmark (State only)
33,585,620	62.13	163,422,017	14.03	65,515,247		Belgium.....
17,637,200	83.74	28,810,000	18.66	13,986,000	56.97	Holland.....
21,472,870	64.95	82,424,588	12.00*	13,971,540	44.00*	Switzerland.....
4,426,236	45.34	13,446,043	20.00	3,775,559	89.00	Portugal.....
6,637,545	57.10	5,234,683	42.00	4,731,195	89.00	Roumania.....
103,748,672	70.70	32,137,319	64.00	63,866,135	183.00	Canada Co.'s.....
6,328,895	97.23	2,277,218	54.00	2,673,217	234.60	Canada Gov't.....
32,044,073	53.05	23,312,987	24.00a	20,123,575	104.00a	Argentina.....
16,077,587	46.58	113,675,403	22.00	21,530,064	63.00	Japan.....
12,173,733	53.08	41,413,084	9.96	8,793,832	66.66	New South Wales...
\$1,628,820,236	62.60	3,975,789,605	15.00c	1,732,946,800	65.00c	Total.....
\$1,537,448,702	66.08	797,946,116	31.54	1,631,374,219	132.33	United States.....

State Railways.

bahnerwesen, being assembled from more recent independent sources.

of national pride and gratification. It establishes the fact that for named the people of the United States have more miles of railway at

make comparisons not only as to the extent of the passenger and to the cost per passenger and ton mile of that service.

in 1907, it would have imposed an additional burden on that traffic making rates that move great volumes of traffic that American rail-

XIII

RECOMMENDATIONS.

In conclusion, I can only repeat the suggestions and recommendations made a year ago, that:

REPORTS.

FIRST, That the annual reports to the Commission required under the Act to Regulate Commerce be confined to those common carriers operating railroads whether engaged in interstate or intrastate commerce. This would simplify the task of the official statistician by excluding all duplications and extraneous information relating to non-operating railroad companies, which merely muddle his conclusions.

ACCIDENTS.

SECOND, That Congress provide for an official investigation of all railway accidents in the United States on lines patterned after the methods so successfully adopted in the United Kingdom. It should be a bureau of the Department of Commerce and Labor composed of:

One Chief Inspector.

Ten District Inspectors, one for each of the groups into which the country is divided, in railway statistics, appointed from U. S. A. engineer service with rank of Major.

Three Deputy Inspectors for each group.

Three Assistant Inspectors for each group.

Three Sub-Inspectors for each group.

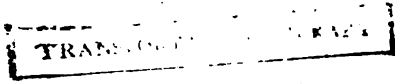
Several groups might require four inspectors of each class and as many could get along with only two.

The various kinds of accidents should be apportioned among these inspectors according to their nature, as they are in Great Britain, and the inquiries should follow without delay as they do there.

Quarterly reports of the results of these inquiries should be published for each group separately; and the Chief Inspector should issue a General Report annually—including the statistics of accidents for the whole country and such comments on the findings of his staff as their nature might justify.

Respectfully submitted,

SLASON THOMPSON.



RAILWAY STATISTICS
OF THE
UNITED STATES OF AMERICA

FOR THE YEAR ENDING JUNE 30

1908

COMPARED WITH

THE OFFICIAL REPORTS OF 1907
AND
RECENT STATISTICS OF FOREIGN RAILWAYS

PREPARED BY
SLASON THOMPSON
BUREAU OF RAILWAY NEWS AND STATISTICS

SECOND EDITION

CHICAGO
R. R. DONNELLEY & SONS COMPANY
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INTRODUCTION

Owing to the concurrence of financial disturbance with statistical innovations, the record of railway affairs in the United States for the year ending June 30, 1908, is a chapter of recession, uncertainty, and confusion. Its statistics give an inadequate idea of the situation precipitated by the panic of 1907 and afford an indifferent basis for comparison with the results of former years.

Where the railways suffered a loss of over \$330,000,000 in gross earnings in the twelve months following that panic, the reports for the year ending June 30, 1908, naturally show a loss of only half this amount, *because the fiscal year included the most prosperous four months in American railway history.*

The accuracy of comparisons with former years is impaired by the introduction of new and arbitrary methods of accounting, the true bearing of which has not yet been fully realized. In 1908 these requirements and legislative regulations touching the hours and conditions of labor added \$32,000,000 to railway pay-rolls and helped to bring on and continue the business depression.

With these conditions understood, an attempt has been made in the following statement to present a comparison of the salient features of railway industry in 1908 compared with the like items in 1898 and 1888. The data for 1908 is compiled from the returns to this Bureau covering 216,460 miles of line, in connection with the monthly reports to the Interstate Commerce Commission covering an average mileage of 226,121 miles operated during the year, and the final report for 1907 averaging 227,455 miles.

**SUMMARY OF RAILWAY RESULTS IN 1908, 1898 AND 1888 WITH PERCENTAGE
OF INCREASE FOR EACH ITEM.**

-Item	1888	1898	1908	In- crease Over 1888 %	In- crease Over 1898 %
Miles of line.....	136,883	184,648	230,000	68.0	24.5
Miles of all tracks.....	168,598	245,333	332,000	96.9	35.3
Net capitalisation (thousands)	\$7,366,745	\$9,297,167	\$13,007,012	76.5	39.8
Net capitalisation per mile of line.....	53,819	51,856	58,664	9.0	13.1
Net capitalisation per mile of track.....	43,694	37,896	40,502	7.9	6.8
Gross earnings (thousands,...	910,621	1,247,325	2,448,835	168.9	96.3
Expenses of operation (thou- sands).....	594,994	817,973	1,704,027	186.4	108.3
Ratio expenses to earnings...	65.34	65.58	69.61	6.5	6.1
Passengers carried one mile (thousands).....	10,100,744	13,379,930	29,540,931	192.4	120.8
Passenger revenue (thou- sands).....	237,266	266,970	570,854	140.6	113.8
Passenger revenue per passen- ger mile (cents).....	2.349	1.973	1.933	d 17.7	d 2.0
Freight tons carried one mile (thousands).....	61,027,464	114,077,576	222,022,415	263.8	94.7
Freight revenue (thousands)	610,884	876,727	1,671,881	173.6	90.7
Freight revenue per mile (cents).....	1.001	.753	.753	d 24.7	0.0
Locomotives, number (1889)..	29,036	36,234	57,156	95.8	57.7
Locomotives, weight (tons)...	1,161,440	1,884,168	4,056,745	249.2	115.3
Passenger cars (1889).....	24,586	33,595	44,623	81.5	32.5
Freight cars, number (1889)..	829,885	1,248,826	2,130,110	156.6	70.5
Freight cars, capacity (tons) .	16,597,700	32,469,476	71,691,028	331.9	120.8
Average tons in train (1889)	179	226	357	99.4	57.9
Employees, number.....	652,500	874,558	1,451,000	122.3	68.2
Employees, compensation.....	\$373,354,700	\$495,055,618	\$1,040,360,520	178.6	110.1
Taxes (1889).....	27,590,394	43,828,224	86,483,951	213.4	97.3

(d) Decrease.

Nothing is more significant in this table than the evidence it affords of the expansion of the means to meet the demands of transportation in the United States. While the vast improvements in roadbed and rails are but partially told in the percentages of increase of line and track mileage, they are seen to be commensurate to carry the burden represented in an increase of 249 per cent. in the weight

of locomotives and 331 per cent in the capacity of freight cars in twenty years.

Great as has been the increase in the gross earnings of the railways, the columns of percentages show that it has been exceeded by the increase in operating expenses and taxes.

RAILWAY INCOME ACCOUNT FOR THE CALENDAR YEAR 1908.

Before proceeding to the consideration of the railway situation for the fiscal year 1907-08, it may not be amiss to present a preliminary statement of the income account of the railways for the calendar year 1908, summarized from the monthly returns to the Interstate Commerce Commission. The reports, covering an average of 227,591 miles, afford the following figures as to receipts and expenditures:

SUMMARY OF OPERATING RECEIPTS AND EXPENSES OF THE RAILWAYS OF THE UNITED STATES FOR THE YEAR ENDING DECEMBER 31, 1908, BY MONTHS, AND OPERATING RATIO.

1908	Total Operating Revenues	Total Operating Expenses	Ratio Expenses to Earnings
January.....	\$173,874,295	\$132,998,391	76.40
February.....	161,268,574	124,391,195	77.13
March.....	183,795,686	128,994,034	70.18
April.....	175,096,037	124,913,606	71.34
May.....	174,554,216	124,562,818	71.36
June.....	184,018,231	123,615,916	67.18
July.....	194,594,190	127,723,085	65.64
August.....	205,953,453	131,138,135	63.67
September.....	218,211,105	136,790,693	62.69
October.....	231,184,083	142,952,898	61.83
November.....	209,852,056	136,012,760	64.81
December.....	209,602,145	139,162,792	66.40
Total.....	\$2,322,004,071	\$1,573,256,324	67.75

Poor's Manual for 1908 reported the gross earnings for 224,382 miles of road for the calendar year 1907 at \$2,602,757,502 and operating expenses at \$1,769,417,903. This would show a decrease in 1908 of \$280,753,432 in earnings and of \$196,161,579 in expenses, making a loss of \$84,591,853 in net, for the calendar year.

JANUARY, 1909.

On March 3d, the Interstate Commerce Commission issued a summary of the monthly reports of revenues and expenses of 198 roads

"Statistics of Railways in the United States" as "Official Statistics"; and "the year ending June 30th" will be implied before the figures of the year specified, unless otherwise stated.

The statements as to foreign railways are compiled from the latest official sources available.

And here the writer wishes to record his personal obligations to the executives and accounting officials of the railways whose co-operation and assistance have made this report possible. Their ready and courteous response to requests for information, in the midst of the exacting duties of a peculiarly trying year, have robbed the gathering of statistics of some of its embarrassments.

Acknowledgments also are due to federal and state officials for their uniform courtesy in responding to the many requests from this Bureau.

SLASON THOMPSON.

Chicago, March 29, 1909.

I

THE PANIC OF 1907 AND THE RAILWAYS OF 1908

Departing from the practice established in 1892, the Interstate Commerce Commission in its twenty-second annual report, under date of December 24, 1908, instead of presenting a preliminary income-report for the year condensed from the annual reports, has substituted a compilation based upon the monthly reports of revenues and expenses received for the twelve months ending June 30, 1908. While differing in many respects from previous preliminary reports, so as to impair its value for comparative purposes, the innovation is in many respects an improvement.

Reduced to its briefest summary, this report affords the following information:

**SUMMARY OF OPERATING REVENUES AND EXPENSES AND TAXES OF THE RAIL-
WAYS OF THE UNITED STATES FOR THE YEAR ENDING JUNE 30,
1908. (AN AVERAGE OF 226,121 MILES REPRESENTED.)**

Item	Amount	Ratio to Total Oper- ating Reva- nues.	Per Mile of Line.
Operating Revenues.			
From freight.....	\$1,665,119,842	68.68	7,364
" passengers.....	566,905,109	23.38	2,507
" all other transportation.....	167,873,795	6.92	742
" operations other than transportation.....	24,687,932	1.02	109
Total operating revenues.....	\$2,424,640,637	100.00	10,722
Operating expenses.			
For maintenance of way and structures.....	\$331,851,544	13.69	1,467
" of equipment.....	372,220,062	15.35	1,646
" traffic expenses.....	48,400,636	2.00	214
" transportation expenses.....	879,757,247	36.28	3,891
" general expenses.....	56,092,069	2.31	248
" unclassified.....	6,780,320	.28	30
Total expenses of operation.....	\$1,695,101,878	69.91	7,496
Net operating revenue.....	729,538,758	30.09	3,226
Taxes.....	83,860,516	3.46	371
Operating income.....	\$ 645,678,242	26.63	2,855

It was upon these figures, showing a loss of \$164,464,941 in gross earnings and \$111,051,006 in net revenues, and excluding an increase of \$3,548,141 in taxes, that the Commission based its question whether "the loss inflicted upon the railroads was so severe as to warrant universal advances in rates or reduction in wages, or both." In the Commission's view, "These figures indicate that whatever may have been the fact in individual cases, the railroads of the country as a whole *did not suffer so severely*, in comparison with years of normal traffic and business conditions as may have generally been supposed."

The truth is that never in the railway history of this country has the transportation industry suffered anything approaching the severe strain put upon it by the combination of oppressive legislation, monetary stringency, and adverse popular sentiment that culminated in the financial depression of the fall of 1907. Even the Commission's own comparisons show a loss in gross earnings \$14,074,864 greater than the railways suffered through the staggering panic of 1893, while the loss in net revenues was \$60,167,906 greater, or more than double the loss in net revenues in that disastrous year.

But the monthly figures upon which the Commission bases its optimistic conclusions should have prevented such deductions from the totals by fiscal years. Financial panics are not timed by the calendar. The business depression of 1907 to which the railways contributed so much and from which, with their allied industries, they were the chief sufferers, came upon them after a period of unparalleled prosperity, during which their resources were taxed to the utmost to meet the insistent demands of increasing traffic.

In October, 1907, the railways of the United States were equipped to handle a traffic yielding gross earnings of \$3,000,000,000. In that month they owned over 56,000 locomotives, over 44,000 passenger cars, over 2,000,000 freight cars, and employed an organized army of over 1,700,000 men. Their expenditures at that time were on a scale of over \$2,000,000,000 a year. This promised a net operating revenue of \$1,000,000,000. They were making improvements and reconstructions and planning extensions commensurate to these conditions, and on this basis their property was being assessed for taxation as a going concern, with imperative public duties.

Suddenly, with only such warning as an ocean steamer has of the vicinity of an iceberg, the transportation industry struck the financial depression. The chill of the approaching trouble had been felt in its sensitive borrowing nerves for months, but the blow to its earn-

ing capacity did not fall until November, 1907. Let the monthly figures furnished by the Interstate Commerce Commission, in the following statement of earnings and expenses and the ratio between them, tell the story:

SUMMARY BY MONTHS OF OPERATING REVENUES AND EXPENSES OF THE RAILWAYS OF THE UNITED STATES FOR THE YEAR ENDING JUNE 30, 1908; ALSO THE OPERATING RATIO.

	Miles Operated at End of Month	Operating Revenues	Operating Expenses	Ratio of Expenses to Revenues
1907				
July.....	223,958	\$228,966,409	\$154,020,066	67.27
August.....	224,560	241,927,308	157,761,701	65.21
September.....	224,744	234,607,549	157,266,043	67.03
October.....	225,216	250,976,437	167,945,937	66.92
(End of Period of Railway Prosperity)....				
November.....	225,658	220,818,639	155,117,131	70.25
December.....	226,359	194,737,255	143,515,038	73.70
Average.....	225,082			
Total six months.....	—	\$1,372,033,597	935,625,916	68.20
Net operating revenue.....			436,407,681	31.80
1908				
January.....	226,780	173,874,295	132,998,392	76.49
February.....	227,017	161,268,575	124,391,196	77.13
March.....	226,858	183,795,686	128,994,034	70.18
April.....	227,382	175,096,037	124,913,606	71.34
May.....	227,239	174,554,216	124,562,818	71.36
June.....	227,678	184,018,231	123,615,916	67.18
Average.....	227,159			
Total six months.....		1,052,607,040	759,475,962	72.15
Net operating revenue.....			293,131,078	27.85
Total twelve months.....		\$2,424,640,637	\$1,695,101,878	69.91

Here it will be seen not only is there a decrease of \$319,426,559 in the gross operating revenues for the first six months of 1908 compared with the last six months of 1907, *but also a decrease of \$143,276,603 in net operating revenues.*

The only fair way, however, to get at the actual effect of the drop in railway revenues in the fall of 1907 is to compare the earnings for the corresponding twelve months ending November 30, 1907 and 1908, as is done in the following statement:

**SUMMARY OF GROSS OPERATING REVENUES OF THE RAILWAYS FOR THE YEARS
ENDING NOVEMBER 30, 1907 AND 1908.**

	Year Ending Nov. 30, 1907		Year Ending Nov. 30, 1908	Decrease
December, 1906.....	\$208,000,000	1907	\$194,737,255	\$13,262,745
January 1907.....	199,000,000	1908	173,874,295	25,125,705
February ".....	178,300,000	"	161,268,575	17,032,425
March ".....	211,700,000	"	183,795,686	27,904,314
April ".....	214,800,000	"	175,096,037	39,703,963
May ".....	224,800,000	"	174,554,216	50,245,784
June ".....	223,000,000	"	184,018,231	38,981,769
July ".....	228,966,409	"	194,582,979	34,383,430
August. ".....	241,927,308	"	205,953,453	35,973,855
September. ".....	234,607,549	"	217,898,373	16,709,176
October ".....	250,976,437	"	231,184,082	19,792,355
November ".....	220,818,689	"	209,852,056	10,966,583
Total twelve months...	\$2,636,896,342		\$2,306,815,238	\$330,081,104

Here is incontrovertible proof that the financial depression following October, 1907, cost the railways well over \$330,000,000 — for an average of 2,591 miles of line more is represented in the reports for 1908.

Whether such a loss is "so severe as to warrant universal advances in rates or reduction in wages, or both," it is not for the writer to speculate. Charged with the duty of providing adequate and efficient transportation for a nation, which between the dates in the above table, according to the government's estimate, increased from 85,131,000 to 87,971,000, or 3.3%, a decrease of over 12% seems quite severe.

Now let us turn to the other side of the railway ledger and see what it discloses as to the effect of the panic on operating expenses during the period covered by the preceding table.

SUMMARY OF OPERATING EXPENSES OF THE RAILWAYS FOR THE YEARS ENDING NOVEMBER 30, 1907 AND 1908.

	Year Ending Nov. 30, 1907		Year Ending Nov. 30, 1908	Decrease
December 1906.....	\$140,400,000	1907	\$143,515,038	†\$3,115,038
January 1907.....	134,325,000	1908	132,998,391	1,326,609
February ".....	121,500,000	"	124,391,196	†2,891,196
March ".....	142,425,000	"	128,994,034	13,430,966
April ".....	144,990,000	"	124,913,606	20,076,394
May ".....	151,740,000	"	124,562,818	27,177,182
June ".....	150,525,000	"	123,615,916	26,909,084
July ".....	154,020,066	"	127,704,535	26,315,531
August ".....	157,761,701	"	131,138,135	26,623,566
September ".....	157,266,043	"	136,475,906	20,790,137
October ".....	167,945,936	"	142,552,898	24,993,038
November ".....	155,117,131	"	136,012,760	19,104,371
Total twelve months...	\$1,778,075,877		\$1,577,275,233	\$200,740,644

† Increase.

Taken together with the immediately preceding table, this statement demonstrates that the railways suffered a loss of \$129,340,460 in net operating revenues. The column of decreases also discloses the fact that it was not until March, 1908, that the railways by adopting drastic economies in operating expense were able to partially offset their losses in gross earnings.

In order to ascertain what class of expenditures felt the forced economies of the year 1907-08 most severely, it is necessary to compare the returns of the six months ending December 31st and June 30th for maintenance of way and structures, maintenance of equipment, and transportation expenses. Under normal conditions 96% of the total operating expenses fall under these three heads—the percentages in 1907 being 19.65, 21.05, and 55.53, respectively. They are divided into two periods in the following statement.

**SUMMARY SHOWING THE DIVISION OF OPERATING EXPENSES BY CLASSES FOR
THE HALF YEARS FOR THE TWELVE MONTHS END-
ING JUNE 30, 1908 (OFFICIAL).**

THE PROSPEROUS HALF YEAR, JULY — DECEMBER, 1907.

1907	Maintenance of Way and Structures	Maintenance of Equipment	Transportation Expenses
July.....	\$33,281,447	\$35,771,157	\$75,575,139
August.....	34,832,507	36,596,736	77,119,862
September.....	34,155,841	36,001,024	77,734,093
October.....	35,488,006	38,958,320	83,708,710
November.....	29,377,922	35,460,888	80,896,967
December.....	23,744,672	32,795,372	77,237,805
Total six months.....	\$190,880,395	\$215,583,497	\$472,272,576

THE DEPRESSED HALF YEAR, JANUARY — JUNE, 1908.

1908			
January.....	\$21,186,268	\$29,736,215	\$72,730,909
February.....	19,020,726	27,486,415	68,931,928
March.....	20,878,255	28,186,274	70,902,543
April.....	24,200,357	26,041,154	65,783,773
May.....	26,387,875	24,612,509	64,657,539
June.....	29,297,688	20,573,998	64,477,978
Total six months.....	\$140,971,149	\$156,636,565	407,484,870
Decrease.....	49,909,246	58,946,932	64,787,906
Per cent decrease.....	25.63	27.33	13.72

There can be no obscuring the story of severe retrenchment told in these tell-tale figures, where in the two departments of maintenance alone a reduction of over \$108,000,000 was made in six months' expenditures. No such economy relatively was possible in the transportation department, where expenditures follow more closely the current necessities of the hour. The maintenance departments not only have to provide for this, but for the past fifty years it has been their province to anticipate facilities for a future which has increased its demands at the rate of approximately 8% every year.

RECEIVERSHIPS IN 1908.

Where in 1907 the official statistician was able to report that the condition in regard to railway receiverships was "practically identical with the condition existing on June 30, 1906," when only one road of any consequence was so situated, the calendar year 1908 saw the following roads pass into the hands of receivers:

RECEIVERSHIPS ESTABLISHED IN 1908.

Railway	Mileage	Funded Debt	Stock
Seaboard Air Line.....	2,611	\$64,185,000	\$62,516,000
Atlanta & Birmingham Air Line.....	216	7,760,000	1,525,000
Chicago Great Western.....	818	.....	107,033,000
Detroit, Toledo & Ironton.....	438	18,920,000	25,000,000
Macon & Birmingham.....	105	500,000	500,000
Tallulah Falls.....	58	874,000	500,000
Chicago, Cincinnati & Louisville.....	284	6,660,000	4,206,000
International & Gt. Northern.....	1,106	25,253,000	9,755,000
Western Maryland.....	543	58,719,000	15,685,000
Cincinnati, Bluffton & Chicago.....	52	825,000	1,125,000
Bainbridge Northeastern.....	16*	.....	200,000
Raleigh & Western.....	8	108,000	128,000
Alaska Central.....	54	3,500,000	4,750,000
Oklahoma Central.....	132	1,800,000	10,000,000
Missouri River & Northwestern.....	35	1,000,000	1,000,000
Wabash-Pittsburg Terminal.....	63	30,236,000	10,000,000
Central Railway of Oregon.....	83	250,000	2,000,000
Wheeling & Lake Erie.....	442	15,000,000	36,980,000
West Side (Pittsburg) Belt.....	22	383,000	1,080,000
Southern Indiana.....	237	10,537,000	11,000,000
Chicago Southern.....	†	4,000,000	1,500,000
Newport & Wickford.....	4	72,000	100,000
Norfolk & Southern.....	580	17,267,000	17,267,000
Newton & Northwestern.....	102	2,460,000	2,500,000
Total.....	8,009	\$271,009,000	\$325,350,000

* Not in operation.

† Mileage included in that of Southern Indiana.

Not since 1893 has there been any such list of roads as this seeking the protection of the courts from the stress of financial embarrassment. Added to the mileage in receivers' hands at the opening of the year, over 12,000 miles were in that condition at its close.

From the receiver of one of the roads in the above list the following letter illustrative of others written under similar conditions was received in reply to the Bureau's request for information:

"DEAR SIR:

"This will acknowledge receipt of your favor of December 10th, addressed to President _____.

"This line being bankrupt, and its earnings being about forty per cent. of its expenses for the year ending June 30, 1908, no attempt has been made to compile the statistics required by you.

"Respectfully,

"_____

"Receiver."

Under such circumstances a request for statistics must have seemed like the last straw to the overtaxed camel.

ACCOUNTING AND RAILWAY ADMINISTRATION.

Such an analysis of the preliminary statistics of the Interstate Commerce Commission for the year ending June 30, 1908, in the Introduction to the Annual Report of this Bureau, finds its justification in the Commission's announced policy of seeking to control railway administration and management through their accounts. This policy found its most definite expression in an address by Professor Henry C. Adams, the Commission's official statistician, delivered before the Association of Government Accountants at Washington, D. C., October 11, 1907. In part, he said:

"The government has recently undertaken to do something quite different from that which it has ever undertaken before. It has undertaken to exercise *a controlling influence upon the administration of railway properties through the agency of their accounts.* . . . And I further call attention in passing to the fact that the success of what the Interstate Commerce Commission is undertaking in this regard, *aiming, as I have remarked, at the control of railway administration through the supervision of railway accounts,* will serve as a model, if it succeeds, for the control of all forms or agencies of consolidated capital which endanger the perpetuation of the principles upon which our government rests. . . . It is this which gives us all, as accountants, the enthusiasm, without which we might not care to drag our weary way through the details of debits and credits. . . .

"Now I suppose it is true that nine-tenths of the attention of the Interstate Commerce Commission, of legislatures, and of state commissions is addressed to the remedy of abuses by this semijudicial method of procedure. But there is another method, and a method which in its full development may become even more important; a method which many believe will prove to be the permanent method; a method which is destined to grow in influence and extend in jurisdiction. I refer to direct administrative supervision."

Again Professor Adams says:

"Call to mind that *the aim* of the supervision of accounting is to exercise influence upon the administration and management of railway property."

Strangely enough, the real scope and limitation of accounting has never been more clearly defined than in the following words of Professor Adams himself:

"The function of accounts is to record facts. True accounting

is nothing more, nor nothing less, than the correct statement of what, in fact, has taken place, and the measurement of that fact in an appropriate figure."

Notwithstanding these truisms, Professor Adams in the introduction to his Twentieth Annual Report of the Statistics of Railways in the United States for the year ending June 30, 1907, under date of July 9, 1908, disclaims for the Commission that its accounting orders "encroach upon the legitimate right of railway executives to manage the property placed in their hands."

It is for the reader to judge whether the deductions made by the Commission from the figures furnished to it by its Bureau of Statistics and Accounts, that the losses experienced by the railways in 1907-08 were not so severe as to warrant universal advances in rates or reduction in wages, or both, are an encroachment upon the legitimate right of railway executives to manage the property placed in their hands.

The reader may also decide whether the summaries as presented and commented on by the Commission fulfill that one and only function of accounts, namely, present a "correct statement of what, in fact, has taken place, and the measurement of that fact in an appropriate figure."

It may be remarked that without this neither the Commission, if it assumes "the administration and management" of railways, nor the railway executives, in whose hands the right of administrative management and responsibility rightfully lodges, can wisely determine whether rates should be advanced or wages reduced or any other administrative measure should be adopted to keep the railways out of bankruptcy while they fulfill their exacting functions as public servants.

INNOVATIONS IN ACCOUNTING.

Aside altogether from the purpose behind the new accounting orders of the Commission, it may be well to question whether they tend to secure as "correct a statement of what, in fact, has taken place," as those which they supersede. In so far as they tend "to impair the basis of comparison between the reports made by the carriers to the Commission of their gross and net earnings for the fiscal year ending June 30, 1908, and their reports of previous years," as the Commission admits they do, these innovations are only to be excused by some material gain in the clearer presentation "of what, in fact, has taken place."

No change in the form of railway accounting or railway reporting is justified that does not accomplish this.

The chief change in railway accounts ordered by the Commission for the year 1908 was "*the exclusion from operating expenses of charges for additions and betterments to way and structures and the inclusion in operating expenses of formal depreciating charges.*"

In railway experience it has been found impossible to draw the line between the upkeep and renewals of way and structures and what are termed additions and betterments. In the replacement of a defective tie with a treated tie the act includes a renewal, which not only takes care of the depreciation but is in the nature of an addition and betterment. In the process of making this renewal more care may be taken in a better adjustment of the tie in its old bed and every moment of time expended on this work, beyond what was necessary to put the new tie in the old bed, is a betterment, the cost of which, the new orders say, must be excluded from operating expenses.

The orders in this regard require an accounting impossibility.

As to the *fixed depreciation charge* to be included in operating expenses, this clearly does not come within the definition or province of accounting. It is so wholly a matter of discretion or guess work that the Commission has not attempted to prescribe what the percentage of the depreciation charge shall be. Its blank for the annual reports of the railways requires it to be added to operating expenses in the following items:

- Work Equipment
- Steam Locomotives
- Passenger Train Cars
- Freight Train Cars
- Electric Equipment of Cars
- Floating Equipment

Now if an arbitrary depreciation charge is to be made on account of these items, why not on the maintenance of the following items of enumerated expenses:

Ties, rails, other track material, tunnels, bridges, trestles and culverts, over and under grade crossings, grade crossings, fences, cattle guards and signs, snow and sand fences and snow sheds, signals and interlocking plants, telegraph and telephone lines, electric power transmission, buildings, fixtures and grounds, docks and wharves, roadway, tools and supplies, power plant equipment, shop

machinery and tools, joint equipment at terminals, coal and ore docks, and stock yards and grain elevators?

Deterioration through wear and tear, caused by use, accidents or the elements, is as constantly present among these items as among those for which the arbitrary depreciation charge is ordered. But it cannot be measured by a percentage, and it can only be taken care of by the exercise of vigilance and intelligence in expenditures to maintain a certain standard of efficiency. The cost of inspection to ascertain the need of repairs is itself a part of the insurance against depreciation.

These expenditures make legitimate entries in the books which keep accounts of facts and not estimates — of what has been, and not of what may or might have been.

An unexpended depreciation charge, be it small or sufficient, cannot rejuvenate an obsolescent locomotive, nor replace a wornout tie or rail.

It is to be hoped that the Commission will reconsider its orders in this regard, so as to restore railway accounting to its legitimate function of stating only facts and not flexible surmises. So it is not reassuring to learn from the Statistician's report for 1907 under date of July 9, 1908, that the form for the report of 1909, among other features, will embrace:

"The revised Income Account and new pages provided for supporting accounts;

"The revised form for reporting operating revenues and operating expenses;

"The new page classifying deductions from receipts before arriving at Operating Revenues, such as overcharges, absorbed switching charges, and the like;

"The pages for the report of Additions and Betterments;

"The elimination of the column from the report of Expenditures for Road and Equipment calling for the amount spent for Additions and Betterments charged to Operating Expenses, and

"Will show further changes, since it will embody the accounting rules developed since July 1, 1908."

It would seem from this that there is to be no let-up in the demands on accounting officials, or any simplification of the means prescribed to ascertain how the railways are meeting their obligations as common carriers and public servants.

II

MILEAGE IN 1908

The preliminary income report of the Interstate Commerce Commission for the year ending June 30, 1908, represented an average operated mileage of 226,121 miles. The reports to this Bureau for the same year cover 216,460 miles, as compared with 212,357 in 1907, an increase of 4,103 miles.

The final mileage for which the Commission had complete returns in 1907 was 227,455 miles, of which 8,325 were operated under trackage rights, a fact that has to be remembered in making certain computations. Of the mileage reporting to this Bureau, 8,278 miles were similarly operated in 1908.

Assuming that the aggregate railway mileage in the United States in 1908 was 230,000 miles, approximately 94% of the mileage and nearly 97% of the traffic are covered in the summaries compiled from the reports to this Bureau.

Reports were also received from six roads too late to be included in the compilation. Briefly summarized they show: Miles of line operated, 1,283; gross earnings, \$5,120,649; operating expenses, \$4,434,943; operating ratio, 86.6%. No less than four of the six had corporate losses on the year's business aggregating \$911,885. Their pay rolls absorbed more than 51% of their gross earnings. From these items it can be inferred what effect their inclusion would have had on the averages for all the railways, which, however, they would not alter materially.

The first summary presents the *operated* mileage reported to this Bureau, classified by states and territories, in comparison with the official figures of mileage *owned* in 1906, with relation to area and population of the respective territorial divisions:

**SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES AND
TERRITORIES IN 1908 AND 1907 AND ITS RELATION TO
AREA AND POPULATION.**

	1908 Operated (94%) Miles	1907 Owned (Official) Miles	Miles of Line per 100 sq. Miles of territory	Inhabi- tants per Mile of Line
Alabama.....	4,644	4,840	9.77	406
Arkansas.....	3,758	4,861	9.21	301
California.....	6,251	6,664	4.38	243
Colorado.....	5,096	5,295	5.11	114
Connecticut.....	936	1,016	20.96	999
Delaware.....	343	336	17.14	615
Florida.....	2,960	3,970	7.39	148
Georgia.....	6,293	6,783	11.65	361
Idaho.....	1,568	1,731	2.09	102
Illinois.....	12,796	12,137	21.80	442
Indiana.....	7,326	7,259	20.24	388
Iowa.....	9,865	9,867	17.87	252
Kansas.....	9,175	8,936	10.94	184
Kentucky.....	3,205	3,441	8.71	690
Louisiana.....	3,805	4,558	10.43	326
Maine.....	1,750	2,093	7.19	361
Maryland.....	1,278	1,432	14.90	906
Massachusetts.....	2,079	2,112	26.45	1,492
Michigan.....	8,312	8,941	15.63	302
Minnesota.....	8,100	8,246	10.46	236
Mississippi.....	3,281	4,081	9.00	416
Missouri.....	8,141	8,039	11.79	429
Montana.....	3,406	3,307	2.28	91
Nebraska.....	6,083	5,932	7.76	200
Nevada.....	1,540	1,700	1.55	28
New Hampshire.....	1,211	1,248	13.86	369
New Jersey.....	2,046	2,250	30.59	917
New York.....	7,989	8,472	17.86	957
North Carolina.....	3,332	4,385	9.21	473
North Dakota.....	4,025	3,906	5.56	118
Ohio.....	9,041	9,261	22.75	502
Oklahoma.....	5,532	5,488	7.84	202
Oregon.....	1,600	1,939	2.07	237
Pennsylvania.....	10,224	11,259	25.25	621
Rhode Island.....	190	208	20.11	2,262
South Carolina.....	2,975	3,271	11.02	451
South Dakota.....	3,568	3,703	4.82	122
Tennessee.....	3,528	3,725	9.01	600
Texas.....	12,932	12,932	4.95	263
Utah.....	1,772	1,957	2.42	156
Vermont.....	926	1,071	11.98	351
Virginia.....	3,900	4,056	10.43	495
Washington.....	3,207	3,767	5.69	152
West Virginia.....	2,777	3,264	13.62	320
Wisconsin.....	6,900	7,459	14.01	304
Wyoming.....	1,414	1,526	1.56	70
Arizona.....	1,684	1,928	1.71	71
New Mexico.....	2,521	2,965	2.42	74
District of Columbia.....	42	31	53.53	9,709
Canada*.....	1,273	.....	.....	.....
United States.....	216,460	227,671	7.74	370

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES AND
TERRITORIES IN 1908 AND 1907 AND ITS RELATION TO
AREA AND POPULATION—Continued.

	1908 Operated (94%) Miles	1907 Owned (Official) Miles	Miles of Line per 100 sq. Miles of territory	Inhabi- tants per Mile of Line
United States, 1906.....		222,572	7.55	373
“ “ 1905.....		217,018	7.34	378
“ “ 1904.....		212,577	7.20	379
“ “ 1903.....		207,187	7.00	384
“ “ 1902.....		201,673	6.82	388
“ “ 1901.....		196,075	6.64	391
“ “ 1900.....		192,941	6.51	393
“ “ 1899.....		188,277	6.37	395
“ “ 1898.....		185,371	6.28	394
“ “ 1897.....		182,920	6.21	390
“ “ 1888.....		149,901	4.95	400

The column of operated mileage in 1908 testifies to the comprehensive character of the reports to this Bureau. The columns giving the territorial distribution of the mileage with reference to area and population are of the highest significance as showing the existing railway facilities in various parts of the Republic. The most striking contrast in this respect occurs between such states as Rhode Island, Connecticut, Massachusetts and New Jersey on the one hand, and Nevada, Montana, Idaho and Wyoming on the other.

The totals for the United States show how steadily the railway network is extending over the whole territory—the ratio to area having increased over 53% in 19 years. To-day we have one mile of railway to 370 inhabitants, where in 1888 there was only one to every 400, proving that railway mileage continues to increase more rapidly than population.

RAILWAY MILEAGE IN FOREIGN COUNTRIES.

The ratios of railway mileage to area and population in the preceding table may be compared with those of foreign countries for 1906 in the following statement:

**SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE TO THE
AREA AND POPULATION OF EACH COUNTRY IN 1906.**

From Archiv für Eisenbahnwesen, May-June, 1908.

Countries	Miles 1906	Miles of Line Per 100 sq. miles	Inhabi- tants Per Mile of Line
Europe			
Germany.....	35,652	17.1	• 1,587
Austro-Hungary (including Bosnia and Herzegovna)....	25,618	9.8	1,854
Great Britain and Ireland.....	23,058	19.0	1,786
France.....	29,293	14.2	1,333
Russia in Europe and Finland (2,057 miles).....	35,214	1.8	2,941
Italy.....	10,203	9.2	3,119
Belgium.....	4,657	40.9	1,428
Netherlands and Luxemburg.....	2,214	15.0	2,703
Switzerland.....	2,698	16.9	1,234
Spain.....	9,103	4.7	1,980
Portugal.....	1,639	4.5	3,333
Denmark.....	2,134	14.3	1,149
Norway.....	1,584	1.3	1,408
Sweden.....	8,180	4.7	629
Servia.....	379	2.1	6,666
Roumania.....	1,995	3.2	2,941
Greece.....	771	3.1	3,118
Turkey in Europe, Bulgaria and Rumelia.....	1,952	1.8	5,000
Malta, Jersey, Isle of Man.....	68	16.1	5,258
Total for Europe. 1906.....	196,415	5.1	1,993
“ “ “ 1905.....	192,251	4.8	2,084
“ “ “ 1904.....	189,806	5.0	2,084
“ “ “ 1903.....	186,685	5.0	2,084
“ “ “ 1902.....	183,989	4.9	2,127
“ “ “ 1901.....	180,817	4.8	2,174
“ “ “ 1900.....	176,396	4.7	2,220
“ “ “ 1899.....	172,953	4.6	2,220
“ “ “ 1898.....	167,614		
“ “ “ 1897.....	163,550		
“ “ “ 1896.....	160,030		
Increase in ten years.....	36,385		
Other foreign countries in 1906:			
Canada.....	*20,597	0.6	258
United States of America inclusive of Alaska (359 miles)	224,679	6.3	349
Mexico.....	13,053	1.6	1,123
Brazil.....	10,800	0.32	1,408
Argentine Republic.....	12,776	1.1	353
Peru.....	1,217	0.32	3,846
Uruguay.....	1,210	1.8	769
Chili.....	2,939	.97	1,123
Central Russia in Asia.....	2,808	1.3	2,777
Siberia and Manchuria.....	5,664	0.11	1,020
Japan.....	5,012	3.1	9,091
China.....	3,699	.08	83,333
British India.....	28,982	1.4	10,000
New Zealand.....	2,519	2.4	330
Victoria.....	3,428	3.9	350

* The official figures for Canada in 1906 are 21,353.

**SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE TO THE
AREA AND POPULATION OF EACH COUNTRY IN 1906.—Continued.**

From Archiv für Eisenbahnwesen, May-June, 1908.

Countries	Miles 1906	Miles of Line per 100 sq. miles	Inhabi- tants Per Mile of Line
New South Wales.....	3,471	1.1	393
South Australia.....	1,916	0.16	188
Queensland.....	3,404	0.5	142
Egypt.....	3,263	0.8	3,030
Cape Colony.....	3,611	1.1	490
Natal.....	906	3.4	862
Transvaal.....	1,361	1.1	637
Total for America.....	293,973		
" " Asia.....	54,655		
" " Africa.....	17,519		
" " Australia.....	17,716		
" " the whole world.....	580,277		

It is a noteworthy feature of this table that more than half the total mileage of the world is in English speaking countries, while that of the United States alone is greater than that of all Europe, including the British Isles.

By comparing the ratios of mileage to area and population in this table with those of the United States on page 21 it will be found that our mileage per square mile is 48% greater than that of Europe, while the disparity in density of population to mileage is in the proportion of more than five to one in favor of the transportation facilities furnished to the people and commerce of the United States.

Pursuing the comparison further, it is evident that Rhode Island is the only state in the Union having a greater density of population per mile than the average for all Europe, while Connecticut, Massachusetts, Maryland, New York and New Jersey are the only other states that approach European conditions. It is this sparsity of population to railway mileage in the United States that makes passenger traffic here so generally unprofitable.

MILEAGE OF ALL TRACKS IN 1908.

The auxiliary trackage of American railways, upon which their ability to provide adequate and efficient service so largely depends, continues to increase more rapidly than their miles of line, as is shown in the following statement:

**SUMMARY SHOWING MILEAGE OF SINGLE TRACK, SECOND TRACK, THIRD TRACK,
FOURTH TRACK, AND YARD TRACK, AND SIDINGS, 1896 TO 1907.**

Year	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	Total Mileage Operated (All Tracks)
1908 (94%).....	216,460	20,101	2,100	1,424	77,839	317,924
1907.....	227,455	19,421	1,960	1,390	77,749	327,975
1906.....	222,340	17,396	1,766	1,279	73,760	317,083
1905.....	216,973	17,056	1,609	1,215	69,941	306,796
1904.....	212,243	15,824	1,467	1,046	66,492	297,073
1903.....	205,313	14,681	1,303	963	61,560	283,821
1902.....	200,154	13,720	1,204	895	58,220	274,195
1901.....	195,561	12,845	1,153	876	54,914	265,352
1900.....	192,556	12,151	1,094	829	52,153	258,784
1899.....	187,534	11,546	1,047	790	49,223	250,142
1898.....	184,648	11,293	1,009	793	47,589	245,333
1897.....	183,284	11,018	995	780	45,934	242,013

It is in this table, combined with those which follow with reference to equipment, rather than in the summary of miles of line, that the student will find the true answer as to how the American railways have been able to handle the enormous increase of traffic during the last decade. Where mileage is seen to have increased only 44,169 miles, or 24%, in ten years, all trackage has increased 85,962 miles, or 36%; and in the meantime second track has increased 75%; third track 99%; fourth track 79; and yard track and sidings 69%.

When it is considered that coincident with this increase in length there has been a continuous improvement in all the accessories of track laying, including the realignment and regrading of thousands of miles of line, the miracle of handling billions of passengers and tons of freight per mile is seen to be due to the well-directed energy of American railway management.

According to the *Railroad Age-Gazette*, the mileage built in the calendar year 1908 was 3,214 miles, the smallest record since 1907, and a decrease of 1,998 miles, or 38%, from 1907, a most significant decline.

At the close of the fiscal year 1908 the mileage of the railways of the United States was approximately at 230,000 miles of line and 332,000 miles of track.

MILEAGE AND TRACK OF BRITISH RAILWAYS.

It is instructive to compare the foregoing totals of mileage and trackage with those of the United Kingdom, as reported to the British Board of Trade for the years ending December 31, 1904 to 1907, as follows:

Description of Track	1907	1906	1905	1904
Single track (miles).....	23,112	23,063	22,870	22,601
Second track.....	12,963	12,934	12,819	12,692
Third track.....	1,385	1,363	1,324	1,271
Fourth track.....	1,103	1,091	1,067	1,030
Fifth track.....	195	186	170	153
Sixth track.....	117	111	97	85
Seventh track.....	51	47	40	35
Eighth to nineteenth.....	87	75	44	34
Sidings.....	14,145	14,032	13,891	13,733
Total trackage.....	53,189	52,904	52,322	51,634

It thus appears that the United States has more than six times as many miles of track of all descriptions as the United Kingdom, while in yard and side-tracks alone it has 46% more than the total of all kinds of British mileage.

III

EQUIPMENT

Throughout the fiscal year 1907-08, except during the opening months, when the traffic was at high tide, there was a surplus of equipment on American railways. The cumulative force of the rising demand for increased equipment had stimulated the output of locomotives and cars during the years 1904 to 1907 beyond anything known in railway history. This is strikingly apparent in the following record of rolling stock built in the United States during that period, and in 1908:

FIVE YEARS OUTPUT OF CARS AND LOCOMOTIVES.

From the Railroad Age-Gazette.

Year	Locomotives	Number Passenger Cars	Freight Cars
1908.....	2,342	1,716	76,555
1907.....	7,362	5,457	284,188
1906.....	6,952	3,167	243,670
1905.....	5,491	2,551	168,006
1904.....	3,441	2,144	60,806

Not only did the manufacture of rolling stock reach its highest level numerically in 1907, but the locomotives were the most powerful ever built. The average capacity of the cars was also greater, while a majority of them were of steel or steel under frame construction. With the business depression of 1907 the urgent demand for more cars was succeeded by a dearth of orders, with the result seen in the above table of 1908.

NUMBER AND CAPACITY OF LOCOMOTIVES FOR SEVEN YEARS 1908 TO 1902.

In the following summary the number and capacity of locomotives is given for the seven years since the Commission has included capacity in the published returns:

Year	Number	Tractive Power Pounds	Weight with- out Tender (Tons)
1908 (94% represented).....	55,006	1,413,581,244	3,910,545
1907 Final returns.....	55,388	1,429,626,658	3,828,045
1906 " ".....	51,672	1,277,865,673	3,459,052
1905 " ".....	48,357	1,141,330,082	3,079,673
1904 " ".....	46,743	1,063,651,261	2,889,492
1903 " ".....	43,871	953,799,540	2,606,587
1902 " ".....	41,225	839,073,779	2,323,877
Increase 5 years to 1907.....	34.4%	70.4%	64.7%

As Canada takes about 10% of the rolling stock manufactured in the United States, it is clear from the preceding tables that the railways of the United States require approximately 1,700 new locomotives annually to replace those worn out or otherwise incapacitated.

Complete returns will raise the figures for 1908 approximately to 57,000 locomotives of 1,455,970,000 pounds tractive power and 4,056,700 tons weight, exclusive of tender. These last figures indicate an increase of over 115% in the weight of locomotives during the decade.

PASSENGER AND FREIGHT CARS.

During the period since the data has been available, the increase in the number of passenger cars and of the number and capacity of freight cars is shown in the following statement:

Year	Passenger Service	Freight Service			Company's Service Number
		Number	Capacity (Tons)	Average	
1908 (94%).....	42,623	2,039,110	71,191,028	35	92,773
1907.....	43,973	1,991,557	67,216,144	34	91,064
1906.....	42,282	1,837,914	59,196,230	32	78,736
1905.....	40,713	1,731,409	53,372,552	31	70,749
1904.....	39,752	1,692,194	50,874,723	30	66,615
1903.....	38,140	1,653,782	48,622,125	29	61,467
1902.....	36,987	1,546,101	43,416,977	28	57,097
Six years increase.....	18.9%	32.5%	64.0%	25%	62.6%

The significant feature of this statement is the column showing the increase in the capacity of freight cars, amounting to 64% in six years. It is this increase, coincident with an increase of 70.4%

in the tractive power of locomotives and the improvement of roadway, that has enabled the railways of the United States to handle an increase of 50.6% in the freight traffic during the period mentioned.

During the same period the population of the United States, as estimated by the national authorities, has increased from 79,000,000 to 87,377,000, or less than 11%, in the meantime passenger cars and passenger engines have increased over 18%.

THE SURPLUS OF FREIGHT CARS.

Fortunately for a just appreciation of the relation of railway equipment to traffic during the recent business depression in January, 1907, the Committee on Car Efficiency of the American Railway Association inaugurated the collection of information respecting the supply and location of freight cars. The inquiry was originally instituted to locate the shortages, but before the work was well under way, and up to the present writing, its chief duty has been to report surpluses. The conditions are shown in the following statement by months from its inception to the latest report available—the early reports being estimated in round numbers:

FREIGHT CAR SHORTAGES AND SURPLUS BY MONTHS FROM JANUARY, 1907, TO FEBRUARY, 1909.

Month	1907 Shortage	1908 Surplus	1909 Surplus
January.....	110,000	342,580	333,019
February.....	150,000	322,513	301,571
March.....	No data	297,042	291,418
April.....	100,000	413,605	.....
May.....	60,000	404,534	.....
June.....	40,000	349,994	.....
July *.....	20,000	308,680	.....
August *.....	15,000	253,003	.....
September.....	60,000	133,792	.....
October.....	90,757	110,912	.....
November.....	57,003	132,829	.....
December (surplus).....	209,310	222,077	.....

(*) In July and August, 1907, there was a net surplus.

It will be observed that the conditions as to surplus cars were practically the same during the winter months of 1907-08 and 1908-09.

In addition to the large number of cars reported as idle during

the spring and summer of 1908, there was an average of over 200,000 freight cars in the shops being overhauled and repaired. As 100,000 is the normal average, this would indicate that in April last, by reason of lack of business, 25% of the freight equipment of the railways of the United States was out of commission.

SAFETY APPLIANCES.

Within the past twenty years practically the entire equipment of the railways of the United States has been fitted with train brakes and automatic couplers, as appears from the following statement covering the situation in 1889 and 1907:

SUMMARY OF LOCOMOTIVES AND CARS FITTED WITH TRAIN BREAKS AND AUTOMATIC COUPLERS IN THE YEARS 1889 AND 1907.

Class	Equipped with Train Brakes		Equipped with Automatic Couplers	
	1889	1907	1889	1907
Locomotives.....	17,995	54,731	222	55,007
Cars: ..				
Passenger.....	22,461	43,675	23,348	43,457
Freight service.....	51,601	1,901,881	46,644	1,972,804
Company's service.....	1,913	59,139	440	38,266
Total.....	93,970	2,059,426	70,654	2,159,534
Total equipment in 1889.....				964,293
" " in 1907.....				2,181,982

From which it will be seen that where less than 10% of the total equipment in 1889 was fitted with these two great safety agencies, an almost negligible percentage was not so fitted in 1907.

THE BLOCK SYSTEM.

Like almost everything in the way of additions and improvements to railway equipment, the rapid progress in the instalment of the block signal system came to a standstill with the end of the calendar year 1907. Where the gain for the year then ending had been over 6,000 miles of line protected by some system of block signals, the increase during the next twelve months as shown by the *Railroad Age-Gazette* was only 1,030 over the 58,679 miles reported by the special board of the Interstate Commerce Commission January 1, 1908. At the close of that year the mileage on which some system of block signals had been installed was as follows:

System	Single Tracks	Two or More Tracks	Total
Automatic block signals (miles).....	5,052	6,890	11,932
Non-automatic block signals (miles).....	39,561	9,216	48,777
Total miles.....	44,613	16,096	60,709
Total miles operated by companies (1907).....			151,455

These figures show that in the twenty years since the instalment of block signals on American roads began over one-quarter of their mileage has been fitted with these labor and life saving appliances.

Regarding "Automatic Stops," in its first annual report the Block Signal and Train Control Board, appointed in July, 1907, under date of November 20, 1908, says, that "until within a few months there have been none of these in use on railroads which are subject to federal authority in this matter." And in further discussing its work the Board makes the following pertinent comments:

"Of the hundreds of descriptions and plans of devices and systems for the promotion of safety in railroad operation examined by the Board so few possess any merit that it is evident that a large proportion of the inventors or proprietors of such devices are entirely unfamiliar with the conditions to be met in railroading, the development of safety appliances, the state of the art of signaling, and often with well-known natural laws. This is manifest in three forms:

"(1) In devices which, no matter how well designed or constructed, would be dangerous or of little or no value.

"(2) In devices or systems which, no matter how well the details of design and construction were carried out, are fundamentally wrong in principle.

"(3) In devices or systems which, while theoretically useful and workable, are designed without regard to the well-known properties of materials or a consideration of the quantitative values of the forces and velocities involved."

Of 371 devices examined by the Board, 184 have been reported on, of which 168 are signal and train stopping devices. Of these only 12 have been considered to possess merit to warrant being installed for practical tests, and only four of the twelve are being so installed.

The Board presents an interesting report of its sub-committee sent abroad to investigate train control and railway signal practice in Europe.

IV

EMPLOYEES

NUMBER, 1,451,000

COMPENSATION, \$1,040,360,000

The official statistics will never reveal the real effect of the business depression of 1907-08 upon the great industrial army of employees dependent on railway earnings for daily bread. They do disclose, however, that on June 30, 1907, this army numbered 1,672,074, and that its compensation for the year then ending was \$1,072,386,427, or 41.42% of the gross earnings of the railways that year.

By October 31, 1907, returns to this Bureau showed that this army had increased to approximately 1,710,000 men, and was earning the highest rate of pay in its experience, and also dividing the highest proportion of the railway earnings of any railway employees in the world, except in Italy. Then came the collapse in business, followed by drastic retrenchments in every branch of railway expenditures. Two methods of adjusting the pay rolls to the situation were presented, by laying off men or by reducing the scale. Owing to the decreased demand for labor and to popular sentiment, the former offered the line of least resistance, so that between October, 1907, and May, 1908, when earnings reached their lowest ebb, over 400,000 employees had been laid off.

It is worthy of note that the surplus freight cars reported in May, 1908, was slightly over 400,000—approximately one idle car for each idle railway employee, or vice versa as more properly representing cause and effect.

On June 30, 1908, there were 1,395,281 persons in the employ of the 351 roads reporting to this Bureau, whose compensation for the year ending at that date aggregated the enormous sum of \$1,021,264,028. From these figures it may be estimated that the total of railway employees in the United States at the close of the last fiscal year was 1,451,000, a decrease of 221,074, or over 13%, compared with 1907. Their compensation, however, aggregated approximately \$1,040,360,000, within \$32,000,000, or 3%, of the record year 1907.

This phenomenon is accounted for by the fact that while the number of employees is "determined from the pay rolls *on June 30, 1908*," according to the official form, the compensation is "the aggregate paid to all the employees in each class named during the year covered by the report."

The first summary under this title gives the number, compensation, and average pay of the several classes of employees on the pay roll of the roads reporting to this Bureau for the year 1908, to which is subjoined the aggregates as reported to the Interstate Commerce Commission for the preceding years:

SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF PAY BY CLASSES IN 1908 AND AGGREGATES FROM 1889 TO 1907.

Class 1908 (216,460 miles represented)	Number	Per 100 Miles of Line	Compensa- tion	Average Pay per Day
General officers.....	3,427	1.6	\$15,333,516	\$15.18
Other officers.....	7,245	3	16,159,640	6.42
General office clerks.....	62,256	28	51,392,746	2.35
Station agents.....	34,170	15	25,095,953	2.10
Other station men.....	131,275	61	81,548,993	1.82
Enginemen.....	56,210	26	83,445,806	4.46
Firemen.....	59,839	27	50,148,968	2.76
Conductors.....	42,028	20	54,604,427	3.83
Other trainmen.....	111,908	52	96,456,628	2.64
Machinists.....	44,292	20	41,947,823	2.95
Carpenters.....	56,974	26	43,726,264	2.40
Other shopmen.....	174,368	81	120,701,636	2.13
Section foremen.....	39,598	18	26,670,207	1.96
Other trackmen.....	285,784	132	120,485,089	1.45
Switch tenders, crossing tenders, and watchmen.....	42,561	19	26,365,877	1.82
Telegraph operators and dispatchers.....	39,416	18	30,732,400	2.30
Employees, account floating equipment.....	8,524	4	6,585,454	2.37
All other employees and laborers.....	195,406	90	129,874,601	1.98
Total 1908 (96% represented).....	1,395,281	645	1,021,264,028	2.25
1907.....	1,672,074	735	1,072,386,427	2.20
1906.....	1,521,355	684	930,801,653	2.09
1905.....	1,382,196	637	839,944,680	2.07
1904.....	1,296,121	611	817,598,810	No data
1903.....	1,312,537	639	775,321,415	No data
1902.....	1,189,315	594	676,028,592	No data
1901.....	1,071,169	548	610,713,701	No data
1900.....	1,017,653	529	577,264,841	No data
1899.....	928,924	495	522,967,896	No data
1898.....	874,558	474	495,055,618	No data
1897.....	823,476	449	465,601,581	No data
1896.....	826,620	454	468,824,531	No data
1895.....	785,034	441	445,508,261	No data
1894.....	779,608	444	No data	No data
1893.....	873,602	515	No data	No data
1892.....	821,415	506	No data	No data
1891.....	784,285	486	No data	No data
1890.....	749,301	479	No data	No data
1889.....	704,743	459	No data	No data

(a) Includes \$30,000,000 estimate pay-roll of Southern Pacific, whose records were destroyed in the San Francisco disaster.

In 1908 labor absorbed 43.38% of the gross earnings of the railways against 41.42% in 1907 and 40.02% in 1906.

The panic of 1893 produced no such recession in railway employment as is here shown from the business depression of 1907. Where there was a reduction from the preceding year of less than 94,000 men employed in 1894, the decrease in 1908, as estimated from the returns for 94% of the railways, was approximately 221,000.

The compensation of employees shows no such ratio of recession for the simple reason that the increased wage scale adopted in the winter and spring of 1906-07 was effective for only a few months in 1907, whereas it prevailed without scaling throughout the year ending June 30, 1908. This condition is reflected in the table of average daily compensation on a succeeding page.

While official figures of total compensation are not available prior to 1895, the above statement shows that where the number of employees has increased less than 100% since then their compensation has increased nearly 130%.

UNREMUNERATIVE EXPENDITURES.

Embedded in the statement of compensation paid to certain classes of railway employees in 1908 is the following evidence of the burdens imposed on the railways by reason of new accounting requirements multiplying reports and legislative enactments regarding conditions of service. Although the effect of these conditions extended to other classes, it was not sufficient to overcome the general decrease of total compensation except in the six classes mentioned in the following statement where the compensation for 1908 is compared with that for 1907:

TOTAL COMPENSATION OF CERTAIN CLASSES OF EMPLOYEES IN 1907 AND 1908.

Class	1907 227,455 miles represented	1908 216,460 miles represented
Other officers.....	\$15,012,226	\$16,157,640
General office clerks.....	48,340,123	51,392,746
Station agents.....	24,831,066	25,095,593
Telegraph operators and dispatchers.....	29,058,415	30,732,400
Employees, account floating equipment.....	6,035,415	6,585,454
All other employees and laborers.....	129,551,951	129,874,601
Total.....	\$252,829,032	\$259,838,794
Add 4% for unreported on 1908.....		10,393,000
Total.....		\$270,231,794
Increase over 1907.....		17,402,762

Here is an increase of over \$17,000,000 in a year of severe depression among classes, only one of which was protected by wage agreements. If the total compensation of these six classes had fol-

lowed the trend in all other lines of railway employment—that is, declined 6%—their total compensation would have been approximately \$237,660,000 instead of \$270,231,794, and the aggregate of railway expenses would have been over \$32,000,000 less than they were.

AVERAGE DAILY COMPENSATION 1908-1892.

Where the data in regard to total compensation of railway employees begins with 1895, that relating to their daily average compensation fortunately runs back to 1892, thus taking in the period of the last severe panic.

In the next statement these averages are given for the entire period covered by official statistics, except for the years 1895 and 1896, which have been omitted to economize space and because they present no significant variations from the averages of 1894.

These averages, it should be explained, are computed under orders of the Official Statistician by dividing the compensation paid by the actual days worked throughout the year in the several classes, as nearly as it has been found practicable to do so.

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF RAILWAY EMPLOYEES FOR THE YEARS ENDING JUNE 30, 1908 TO 1892.

Class	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1894	1893	1892
General officers...	15.18	11.93	11.81	11.74	11.61	11.27	11.17	10.97	10.45	10.03	9.73	9.54	9.71	7.84	7.62
Other officers....	6.42	5.99	5.82	6.02	6.07	5.76	5.60	5.56	5.22	5.18	5.21	5.12	5.75	.....	.....
General office clerks.....	2.35	2.30	2.24	2.24	2.22	2.21	2.18	2.19	2.19	2.20	2.25	2.18	2.34	2.23	2.20
Station agents...	2.10	2.05	1.94	1.93	1.93	1.87	1.80	1.77	1.75	1.74	1.73	1.73	1.75	1.83	1.81
Other station men	1.82	1.78	1.69	1.71	1.69	1.64	1.61	1.59	1.60	1.60	1.61	1.62	1.63	1.65	1.68
Enginemen.....	4.46	4.30	4.12	4.12	4.10	4.01	3.84	3.78	3.75	3.72	3.72	3.65	3.61	3.66	3.68
Firemen.....	2.76	2.54	2.42	2.38	2.35	2.28	2.20	2.16	2.14	2.10	2.09	2.05	2.03	2.04	2.07
Conductors.....	3.83	3.69	3.51	3.50	3.50	3.38	3.21	3.17	3.17	3.13	3.13	3.07	3.04	3.08	3.07
Other trainmen	2.64	2.54	2.35	2.31	2.27	2.17	2.04	2.00	1.96	1.94	1.95	1.90	1.89	1.91	1.89
Machinists.....	2.95	2.87	2.69	2.65	2.61	2.50	2.36	2.32	2.30	2.29	2.28	2.23	2.21	2.33	2.29
Carpenters.....	2.40	2.40	2.28	2.25	2.26	2.19	2.08	2.06	2.04	2.03	2.02	2.01	2.02	2.11	2.08
Other shopmen...	2.13	2.06	1.92	1.92	1.91	1.86	1.78	1.75	1.73	1.72	1.70	1.71	1.69	1.75	1.71
Section foremen..	1.96	1.90	1.80	1.79	1.78	1.78	1.72	1.71	1.68	1.68	1.69	1.70	1.71	1.75	1.76
Other trackmen...	1.45	1.46	1.36	1.32	1.33	1.31	1.25	1.23	1.22	1.18	1.16	1.16	1.18	1.22	1.22
Switchmen, flagmen and watchmen.....	1.82	1.87	1.80	1.79	1.77	1.76	1.77	1.74	1.80	1.77	1.74	1.72	1.75	1.80	1.78
Telegraph operators and dispatchers.....	2.30	2.26	2.13	2.19	2.15	2.08	2.01	1.98	1.96	1.93	1.92	1.90	1.93	1.97	1.93
Employees accounting, floating equipment....	2.37	2.27	2.10	2.17	2.17	2.11	2.00	1.97	1.92	1.89	1.89	1.86	1.97	1.96	2.07
All other employees and laborers.....	1.98	1.92	1.83	1.83	1.82	1.77	1.71	1.69	1.71	1.68	1.67	1.64	1.65	1.70	1.67

The average pay of general officers for 1908 in this summary is out of proportion because the returns for that year cover only 60% of that class and include all the more important systems.

It will be observed that the averages for 1908, in spite of the depression, exceed the high level attained in 1907. The reason for this has already been explained. The effect of the depression of 1907-08 was to reduce the number of days worked and not the wage scale.

The increase in the daily average pay of the four classes most immediately employed in the operation of trains between 1898 and 1908 were—engineers, 20%; firemen, 32%; conductors, 22%, and trainmen (the largest class of the four), 35%. A close estimate places the increase of all employees during the same period at 23%.

Despite the vast sums expended on straightening lines, rectifying curves, reducing grades and improving physical structures, equipment, and facilities for handling transportation in every direction, the fact remains that the labor cost to produce \$1,000 gross earnings is greater to-day than it was ten years ago. Last year it was \$433 against \$399 in 1898. The remarkable economies introduced in transportation during the past decade have simply inured to the benefit of labor, in increased compensation, and to the public in more efficient and cheaper service.

PAY OF RAILWAY EMPLOYEES IN OTHER COUNTRIES.

In Germany and Switzerland statistics of railway employment are available in a form that furnishes a definite basis for comparison with that on American railways. In 1907 there were 695,557 persons in the employ of the state and private railways of the German empire. Of these, 674,244 worked for the state roads, which include all the principal railways of Germany. They received a total compensation of \$238,206,998, or \$353 per employee annually. The average for the empire was \$352 against \$641 per man in the United States and \$261 in the United Kingdom in 1907.

The number and pay of the German railway employees in the four main classes into which they are divided in 1907 were as follows:

SUMMARY OF NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES BY PRINCIPAL DIVISIONS IN 1907.

Division	Employees Number	Compensation (total)	Average per Year
General administration.....	30,766	\$23,165,155	\$753
Maintenance and guarding road.....	174,899	41,298,105	236
Station service and train crews.....	307,088	110,625,254	360
Switching crews and shops.....	182,804	70,301,345	384
Total.....	695,557	\$245,389,859	\$352

In 1907 labor absorbed 37.25% of the gross receipts of German railways.

According to the latest enumeration there were 621,341 employees in railway service in the United Kingdom. The wages paid them during the calendar year 1907 amounted to \$162,440,000, or an average of only \$261 per man, boy and porter. Of the last named there are 56,402, of whom 4,695 are boys, whose scant wages are eked out by the universal tip system. All told there are 35,375 boys on the pay rolls of British railways, which may account for the small average pay of British railway employees.

The railways of Switzerland in 1906 employed 38,442 persons, whose pay in the four divisions averaged: General administration, \$488 per annum; maintenance and inspection of way, \$143; transportation and train service, \$382, and porters and laborers, \$263. The average for all divisions was \$291. Only 31.3% of the gross earnings of the Swiss railways was paid to employees in 1906. Therefore it would seem that the cause of their financial difficulties, reported in November last, must be looked for elsewhere, than in excessive pay rolls. In Italy, on the contrary, excessive pay rolls account for the bankruptcy of the state roads.

RETAIL PRICES OF FOOD, 1880 TO 1907.

Closely related to the question of wages is the cost of living and the price of food, in regard to which this Bureau is in constant receipt of inquiries. It has no independent data bearing on the subject, but presents the subjoined table from Bulletin No. 77 of the Bureau of Labor issued last July.

It may be premised that the author of the bulletin estimates that 42.54 of the living cost of a family is expended for food, the other principal items being clothing, 14.04%; rent, 12.95%; fuel,

4.19%; furniture and utensils, 3.42%; labor and other organizations, 2.53%; sickness and death, 2.67%; and miscellaneous, under fourteen headings, including taxes, 17.66%.

The average cost of food per family in 1907 is estimated at \$374.75 per annum. The first place is given to "fresh beef," as it leads in the dietetics of the average American family. The others follow as they rank in consumption.

In the tables which follow the prices are given relatively to the average price for the ten years 1890-1899 which equal 100.

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES 1890-1907.

(Average price for 1890-1899=100.0)

Year	Beef, Fresh, Roasts	Butter	Milk, Fresh, Un- skim- med.	Eggs	Flour, Wheat	Sugar	Pork, Fresh	Pork, Salt, Dry or Pick- led	Pota- toes, Irish
1890.....	99.5	99.2	100.5	100.6	109.7	118.6	97.0	95.3	109.3
1891.....	100.0	106.4	100.5	106.9	112.5	102.7	98.7	98.9	116.6
1892.....	99.6	106.8	100.6	106.8	105.1	96.2	100.5	100.5	95.7
1893.....	99.0	109.9	100.4	108.1	96.1	101.5	107.0	108.7	112.3
1894.....	98.3	101.7	100.2	96.3	88.7	93.8	101.8	103.4	102.6
1895.....	98.6	97.0	100.0	99.3	89.0	91.8	99.7	99.2	91.8
1896.....	99.1	92.7	99.9	92.8	92.7	96.6	97.4	95.5	77.0
1897.....	100.3	93.1	99.7	91.4	104.3	95.7	97.6	97.3	93.0
1898.....	101.7	95.1	99.4	96.2	107.4	101.3	98.6	99.1	105.4
1899.....	103.7	97.7	98.9	101.1	94.6	101.7	101.7	101.8	96.1
1900.....	106.5	101.4	99.9	99.9	94.3	104.9	107.7	107.7	93.5
1901.....	110.7	103.2	101.1	105.7	94.4	103.0	117.9	117.5	116.8
1902.....	118.6	111.5	103.3	119.1	94.9	96.0	128.3	132.5	117.0
1903.....	113.1	110.8	105.8	125.3	101.2	96.1	127.0	129.0	114.8
1904.....	112.8	109.0	106.3	130.9	119.9	101.9	124.0	125.8	121.3
1905.....	112.2	112.7	107.0	131.6	119.9	103.9	126.6	126.0	110.2
1906.....	115.7	118.2	108.9	134.2	108.1	98.2	137.7	136.9	114.4
1907.....	119.1	127.6	116.8	137.7	117.7	99.6	142.5	141.2	120.6

Year	Bread, Wheat	Coffee	Mutton	Poul- try	Lard	Fish, Fresh	Fish, Salt	Tea	Beef, Salt
1890.....	100.3	105.4	100.7	101.3	98.2	99.3	100.7	100.0	97.5
1891.....	100.3	105.2	100.6	104.0	99.8	99.6	101.7	100.4	98.3
1892.....	100.3	103.8	101.0	103.8	103.6	100.1	102.2	100.2	99.5
1893.....	100.1	104.8	99.9	104.2	117.9	100.1	103.4	100.1	100.3
1894.....	99.9	103.3	97.8	98.6	106.9	100.4	101.5	98.7	98.9
1895.....	99.0	101.7	98.7	98.4	100.1	99.8	98.9	98.5	99.6
1896.....	99.9	99.6	98.7	97.1	92.5	100.2	97.5	98.8	99.8
1897.....	100.0	94.6	99.6	94.0	89.8	99.8	95.2	98.5	109.9
1898.....	99.8	91.1	100.4	98.8	93.9	100.5	98.8	100.7	102.1
1899.....	99.6	90.5	102.6	101.8	97.1	100.2	100.2	104.4	103.2
1900.....	99.7	91.1	105.6	100.8	104.4	100.4	99.1	105.5	103.7
1901.....	99.4	90.7	109.0	103.0	118.1	101.4	100.9	106.7	106.1
1902.....	99.4	89.6	114.7	113.2	134.3	105.0	102.8	107.2	116.0
1903.....	100.2	89.3	112.6	118.5	126.7	107.3	108.4	106.4	108.8
1904.....	103.9	91.8	114.1	120.7	117.3	107.9	111.7	105.8	108.3
1905.....	104.5	93.6	117.8	123.6	116.6	109.9	113.8	105.7	107.9
1906.....	102.3	94.7	124.1	129.1	128.0	116.2	116.8	105.5	110.8
1907.....	104.5	95.0	130.1	131.4	134.2	120.6	122.6	105.3	114.1

It will be observed that prices did not reach their low level after the panic of 1893 until between 1895 and 1896.

Relative prices are not given in the above table for other vegetables than potatoes, nor for fruits, of which there is a large consumption, but we are told that "evaporated apples" have advanced 24.6 above the standard, while prunes have fallen 11.6 below it.

Rice, which stands almost at the foot in consumption by American families, although of high nutritive value, shows the comparatively small advance of 8.5% above the average of 1890-1899.

It is evident from the foregoing table that the relation between wages and the cost of living remains to be settled by each family for itself.

V

CAPITALIZATION IN 1908

Returns to this Bureau for the year ending June 30, 1908, show an approximate net capitalization of \$13,007,012,563 for the entire railway system of the United States. This is equivalent to \$58,664 per mile of line, and of \$40,470 per mile of track.

Fortunately for the railways of the United States, the Official Statistician has finally recognized net capitalization as the only true measure of the capital investment. This he does tacitly by omitting the misleading "per mile of line" column in his "Summary of Railway Capital" in his annual report for 1907, and in frank terms in the following paragraph in his report on the "Intercompany Relationships of Railways in the United States," under date Washington, D. C., March 10, 1908:

"If the problem be to state the amount of securities which are an actual or a contingent claim upon the revenues of the railways of the country considered as a whole, it is evident that the phrase "in the hands of the public" must exclude from outstanding capital all railway holdings. This has been done by the present investigation, and results in a reduction of the amount which *general discussions* have heretofore accepted as measuring the claim of railway securities on railway revenues *from \$67,936 per mile of line (1906) to \$58,050 per mile of line*. The statistical reports issued from this office *have never before ventured to publish this net figure*, but have contented themselves with stating the amount of stocks and bonds reported by the carriers as outstanding, and the amount of railway securities reported as owned by railway corporations, and have designated the difference between these two amounts as the amount not owned by railway corporations. . . . This report makes public for the *first time* a correct statement of the portion of securities outstanding in the hands of the public."

This statement of the Official Statistician has been anticipated in the published reports of this Bureau since 1904, which have given the net capitalization of the railways, in the hands of the public, as follows:

	Net Capital	Per Mile of Line
1904	\$10,711,794,278	\$52,099
1905	11,167,105,992	53,328
1906	12,628,000,000	57,966
1907	13,064,279,303	59,600

In his final report for 1907, the Official Statistician places the gross capitalization at \$16,082,146,683, which would be equivalent to \$73,400 per mile of line. By deducting securities owned and "also \$145,321,601 capital assigned to other properties, as, for example, coal mines, lumber properties, and the like," he arrives at \$58,298 as the "net amount outstanding in the hands of the public on June 30, 1907."

In this same report the Statistician omits the table of "Ownership of Railway Stocks and Bonds from 1889 down," which is necessary to correct the summaries of gross railway capital, which he retains, as also the table showing the fictitious amounts paid in dividends since 1888. He gives prominence to \$308,088,627 as the amount paid in dividends in 1907, whereas in the comparative Income Account the *net dividends* are stated to be \$227,394,642. Having decided to publish the net capital as the correct statement of railway securities outstanding in the hands of the public, the Statistician might well discard a gross dividend statement which he has frequently referred to as based on a "fictitious figure" of total earnings and income. (Vide Report for 1904, page 84.)

The omission of the tables showing classification of capital by rate of dividends or interest by groups, relieves the report for 1907 of no less than six pages of "dead timber."

The table of railway ownership of railway stocks and bonds, which is necessary to ascertain the amount of railway capital outstanding in the hands of the public, as given in the nineteenth annual report of the Official Statistician, but omitted in the twentieth annual report, is as follows:

**COMPARATIVE SUMMARY OF OWNERSHIP OF RAILWAY STOCKS AND BONDS FOR
THE YEAR ENDING JUNE 30, 1907 TO 1889.**

Item	Amount Outstanding	Owned by Railway Corporations
Total stocks and bonds:		
1907.....	\$13,053,974,156	\$3,028,172,527
1906.....	13,070,531,055	2,898,480,829
1905.....	12,579,006,974	2,638,152,129
1904.....	12,086,798,312	2,501,330,601
1903.....	11,582,289,186	2,318,391,953
1902.....	11,237,623,206	2,208,518,793
1901.....	10,855,377,815	2,205,497,909
1900.....	10,764,206,416	1,943,050,349
1899.....	10,246,066,102	1,801,913,167
1898.....	10,029,030,953	1,521,386,255
1897.....	9,904,553,850	1,466,936,176
1896.....	9,744,399,332	1,501,346,914
1895.....	9,603,014,204	1,447,181,534
1894.....	9,428,007,413	1,544,058,670
1893.....	9,173,318,580	1,563,022,233
1892.....	8,935,679,756	1,391,457,053
1891.....	8,532,270,702	1,282,925,716
1890.....	8,533,580,042	1,406,907,001
1889.....	8,518,718,578	1,151,972,901

In 1906, the total railway capital owned by railway corporations given in the above table was divided between \$2,257,175,799 stocks and \$641,305,030 bonds. In the general balance sheet for the year ending June 30, 1907, with only 210,792 miles of line represented, the "stocks owned" are stated to amount to \$2,093,667,210 and "bonds owned" to \$934,505,317 — a total of \$3,028,172,527. This subtracted from the \$16,082,146,683 gross capital, as above stated, would leave \$13,053,974,155 as the amount outstanding June 30, 1907.

Unfortunately there has always been a discrepancy in the official statistics between the stocks and bonds owned as stated in the balance sheet and in the table as above printed. In 1906 this difference amounted to the not inconsiderable sum of \$428,433,270.

NET CAPITALIZATION IN 1908.

Speaking of non-operating roads "the operations of which are included in the operating report of the principal company," in his first report as Statistician in 1888, Professor Adams said: "For the most part, the roads filing financial reports maintain their corporate existence merely for the purpose of receiving and disbursing rentals paid by lessee roads."

This being manifestly true, the only capitalization coming prop-

erly under the provisions of the Act to Regulate Commerce was that of the operating roads, arrived at by deducting the cost of stocks and bonds owned by them from their outstanding capital and adding the capitalized rental of the leased roads. The sum thus obtained is the only capitalization which, in the language of the Statistician in his report on the Intercorporate Relationships of Railways, "measures the claim of railway securities on railway revenues."

Applied to the returns received by this Bureau, which relate exclusively to operating roads, this formula yields the following result for the year ending June 30, 1908:

SUMMARY SHOWING CAPITALIZATION OF 351 COMPANIES OPERATING 216,460 MILES OF LINE FOR THE YEAR ENDING JUNE 30, 1908.

	1908 (216,460 miles operated)	
Capital stock.....	\$5,929,776,486	
Funded debt.....	7,536,298,246	
		\$13,466,074,732
Rental of 38,619 miles, \$113, 529, 261 capitalized at 5%.....		2,270,585,400
		\$15,736,660,132
Deduct:		
Stocks owned, actual values.....	\$1,876,072,521	
Bonds owned, actual values.....	1,056,753,447	
		\$2,932,825,968
Net capital, 1908.....		\$12,803,834,164
" " " per mile of line.....		61,545

Placing an estimate of \$25,000 a mile on the 13,500 miles of line not included in reports to this Bureau would add \$348,500,000 to the above total, and deducting the \$145,321,601 assigned by the Official Statistician in his last report to "other properties," we arrive at the following close approximation:

Net Capitalisation, 230,000 miles of line in 1908	\$13,007,012,563
Net Capitalisation per mile of line.....	58,664

In computing the average per mile, 8,278 miles operated under trackage rights are deducted from the mileage operated.

The only figures in the above computation open to question are the rate at which rentals are capitalized and the estimates of \$25,000 per mile made for the non-reporting roads. It is believed that both are reasonable approximations. The former yields a capitalization

of \$58,800 per mile for the leased lines, while the latter fairly represents the actual capitalization of the several hundred minor roads it covers. The final estimate varies only \$366 per mile of line above the final estimate of the Official Statistician for 1907.

CAPITALIZATION OF FOREIGN RAILWAYS.

How this capitalization of \$58,664 per mile compares with the capitalization or cost of construction of the railways of the principal foreign countries is shown in the following statement, compiled from the latest available returns:

RAILWAY CAPITALIZATION OF THE PRINCIPAL FOREIGN COUNTRIES.

Year	Country	Miles of Line	Capital or Cost of Construction	Per Mile
	Europe:			
1907	United Kingdom.....	23,108	\$6,292,099,773	\$272,291
1907	Germany.....	34,980	3,752,450,445	107,272
1905	Russia in Europe.....	32,196	2,675,195,310	83,080
1905	France.....	25,492	3,220,876,646	126,350
1906	Austria.....	13,418	1,502,640,000	112,000
1906	Hungary.....	11,609	738,880,000	63,633
1907	Italy.....	10,704	1,172,730,000	109,560
1905	Spain.....	8,432	649,919,610	77,079
1905	Sweden.....	7,763	249,980,100	32,200
1906	Belgium (state).....	2,520	426,334,730	169,140
1906	Switzerland.....	2,668	278,061,409	104,220
	Other Countries:			
1907	Canada.....	22,452	1,254,682,745	55,882
1906	British India.....	28,982	1,257,120,000	43,350
1906	Argentine Republic.....	12,746	644,640,000	50,576
1907	Japan.....	4,808	215,686,821	44,860
1908	New South Wales.....	3,472	223,476,210	64,365
1908	United States of America.....	a230,000	13,007,012,563	58,664
1908	United States of America (all tracks)	b332,000	.....	40,470

a Includes 8,278 miles operated under trackage rights; b includes 10,600 operated under trackage rights.

This table bears conclusive testimony to the remarkably low capitalization of American railways. Wherever conditions approach those in this country, the foreign railways have a capitalization of from twice to five times that of our roads. In such countries as British India and Japan labor, which absorbs so much of the cost in the United States, is so cheap that the wonder is that the railways cost what they have. In Sweden the cheap railways built by the state cost nearly \$46,000 per mile to only \$23,380 for those owned by private companies.

CAPITAL CHARGE AND COST.

Attention having been called by a statistician of authority to the use of the heading "Capital or Cost of Construction" in the above table as implying that they are synonymous, it is proper to say that they are meant to be — *so far as they represent the investment* which is a charge on railway revenues. They are so used in leading financial and railway publications. The objection to this use is that one is a liability and the other an asset.

This appears to be a refinement of bookkeeping, necessary in making a balance sheet. In a scientifically adjusted system of accounts the terms would always balance as they are made to arbitrarily for the state railways of Switzerland, where the figures of cost and capital are identical.

In the United States, for the obvious reason that we do not and never can know the original cost, or the expenditures continually being made for improvements out of income, only by substituting some empirical and theoretical estimate for actual payments, can capital and cost of construction be made to balance.

The British Board of Trade does not attempt any such feat of statistical legerdemain, but contents itself with regulating railway service and rates. The figures for the United Kingdom in the table are from the Board of Trade's report of total "Capital Paid Up," which is \$488,173,621 less than "Capital Authorized."

GERMAN RAILWAY STATISTICS.

The official "Statistik" of the German Empire afford an interesting side light on this question. They give 15,696,753,238 marks as the total cost of construction (baukosten) and 15,635,210,188 marks as the charge hereafter to "Construction Capital" (verwendetes anlagekapital). The difference between these vast sums amounts to less than \$100 per mile, and previous to 1905 the capital charge exceeded the cost per mile.

It may be of interest to those enamored of the way railways are financed in the German Empire to read that in spite of their reported prosperity their capital charge is mounting up at a rate that would alarm any less strongly entrenched bureaucratic government. Between 1897 and 1907 the "construction capital" increased 3,781,382,188 marks with so slight increase in mileage or facilities that the capital charge per kilometer in the decade rose from 251,877 marks to 277,121 — an advance of \$9,770 per mile. In the mean-

time the public debt of Germany increased from \$421,500,000 to \$965,000,000, and that of Prussia, which is more to the point because it was chiefly incurred on account of railways, from \$1,587,750,000 to \$1,863,521,000. In discussing German finances, it is sometimes convenient to forget those of Prussia.

It should be noted that these comparisons are exclusive of the recent large German loans negotiated for the too long deferred rehabilitation of way and rolling stock of the railways of the empire.

VI

COST OF CONSTRUCTION, 1908

In the railway balance sheet among the assets to offset their capitalization, first place is given to cost of road, cost of equipment, and securities owned. Were it possible to state the sum of the first two with any degree of convincing accuracy, the ground would be cut from under the agitation for an official physical valuation of the railways in detail. Aside from the physical impracticability of appraising 330,000 miles of track and its concomitants, with the attendant processes of depreciation, renewals, and reconstruction in constant operation, under the widely divergent climatic and topographical conditions of 3,026,789 square miles of as variegated country as the sun shines on, it would be but an estimate at best, impossible of verification and becoming obsolete during the period necessary to its incubation. Moreover, the accessible figures of cost are sufficiently accurate to render such a valuation unnecessary.

In the general balance sheet for the year 1907, the Official Statistician gives the following data covering 210,792 miles of line:

COST OF ROAD AND EQUIPMENT FOR 1907, SHOWING INCREASE OVER PRECEDING YEAR.

Item	Amount	Increase
Cost of road.....	\$12,071,535,023	\$407,316,008
Cost of equipment.....	958,809,305	103,964,349
Total.....	\$13,030,344,328	\$511,280,357

The author states that the first item "includes some data for cost of equipment not separately reported." This must necessarily be so, for the present equipment of all the railways of the United States cannot have cost less than \$3,000,000,000.

It is also noteworthy that the foregoing table covers 16,662 miles of line less than are represented in the official tables of capitalization for 1907. Therefore, while the totals of cost and capitalization are practically the same, the figures per mile of line differ as follows:

Cost per mile of line.....	\$61,341
Capitalisation per mile of line.....	\$58,298
Excess of cost per mile.....	\$3,043

While this difference is "not so wide as a church door," yet applied to 220,000 miles of line it amounts to nearly \$670,000,000, or enough to build three Panama canals according to the original sanguine estimates.

Between 1905 and 1907 the Commission's balance sheet shows an increase of cost of road and equipment of \$916,325,468. During the two years the official reports give the following increases, from which the cost has been approximated:

Item	Increase	Cost per Item	Aggregate Cost
Miles of track.....	21,179	\$40,000	847,160,000
Locomotives.....	7,031	15,000	105,465,000
Passenger cars.....	3,260	8,000	26,080,000
Freight cars.....	260,168	1,000	260,168,000
Company's cars.....	20,315	500	10,157,500
Total increase cost in two years.....			\$1,249,030,500
Excess over reported increase.....			332,705,332

Here is a third of a billion dollars' increase in two years, of which the official balance sheet takes no account, without making allowance for the betterments involved in renewals of road and equipment continually necessary on 306,796 miles of track. What value is added to rolling stock by replacements may be judged from the fact that between 1905 and 1907 the capacity of all freight cars was raised from 31 to 34 tons, or nearly 10%. This increase alone was equivalent to adding the capacity of 200,000 thirty-ton cars to the rolling stock of 1905.

COST OF ROAD AND EQUIPMENT IN 1908.

Owing to material changes in the official forms for keeping expenditures for road and equipment introduced for the year ending June 30, 1908, greater confusion and uncertainty than usual has attended the returns on this difficult requirement. However, the 351 roads reporting to this Bureau furnish the data for the following statement:

SUMMARY OF COST OF ROAD AND EQUIPMENT COVERING 216,460 MILES OF
OPERATED LINE FOR 1908.

Item	
Cost of road (177,841 miles owned)	\$6,390,119,212
Cost of equipment	1,160,296,366
Undistributed cost of road and equipment	3,592,772,721
Cost of 38,619 miles of leased road at two thirds of their capitalised rental	1,800,000,000
Total	<u>\$12,943,188,299</u>

If to this be added the sum of \$338,500,000 to represent the cost of road and equipment of the 13,540 miles of line not reporting to this Bureau, we reach the total of

\$13,281,688,299

as the estimated cost of all the railways of the United States for the year 1908. This amounts to \$59,908 per mile against a net capitalization of \$58,664 per mile.

By reason of the incompleteness of uniform data this is but an estimate after all, and an underestimate at that. It is simply given for what it is worth.

Whether this construction cost of the railways would be found excessive by any physical valuation, such as the Interstate Commerce Commission is urging, may be judged from the results in Minnesota and Washington, where after three years of diligent investigation the state commissions respectively have reported that it would cost \$54,201 per mile to reproduce the railways of Minnesota and \$73,000 per mile to reproduce the 805 miles of the Great Northern, \$67,900 per mile for the 1,624 miles of the Northern Pacific, and \$75,000 per mile for the 262 miles of the Oregon Railroad and Navigation Company in the state of Washington.

Some light on the bearing of these state valuations may be gained by comparing them with the net capitalization of the railways in the Interstate Commerce Commission groups to which they belong.

The net capitalization of the railways in Group VI, which includes Minnesota, Illinois, Iowa, Washington, and parts of Missouri, the Dakotas and Minnesota, in 1906 was \$43,720 per mile.

The net capitalization of the railways in Group X, which includes Washington, Oregon, California, Idaho, Nevada, Utah, Arizona, and a part of New Mexico, in 1906 was \$48,906.

The gross capitalization of the Great Northern, which includes the cost of its intercorporate holdings and expensive terminals in St. Paul, Minneapolis, and Duluth, is less than \$46,000.

MINNESOTA RAILROAD APPRAISALS OF JUNE 30, 1907.

It may not be amiss here to reproduce from the supplement to the annual report of the Railroad and Warehouse Commission of Minnesota for 1908 a condensed statement of the capitalization, and the companies, and the Commission's estimate of cost of reproduction of the railways of Minnesota, as follows:

STATEMENT SHOWING THE COST OF REPRODUCING THE RAILROADS OF MINNESOTA, AS ESTIMATED BY THE ROADS AND THE STATE FOR JUNE 30, 1907, TOGETHER WITH THE MILEAGE AND CAPITALIZATION AS APPORTIONED TO MINNESOTA.

Name of Road	Main Line Miles in Minnesota	Stock and Funded Debt, June 30, 1907 Minnesota Proportion	Total cost of Reproduction	
			Railway Estimate, 1906	State Estimate
C. B. & Q. Ry.	23.46	\$757,242	\$2,957,221	\$2,726,670
C., G. & W. Ry.	117.59	16,743,875	17,639,880	7,769,914
C., M. & St. P. Ry.	1,201.98	43,371,044	54,888,175	54,591,393
C. & N.-W. Ry.	651.90	25,068,954	20,914,139	21,214,978
C., R. I. & P. Ry.	236.21	12,095,606	11,280,105	8,716,216
C., St. P., M. & O. Ry.	431.12	16,717,540	29,217,691	26,778,560
D. & I. R. R.	240.83	14,232,000	27,267,140	20,564,552
D. M. & N. Ry.	142.12	13,155,500	24,081,985	23,087,672
D. & N. E. R. R.	63.50	500,000	665,582	859,865
D. & N. M. Ry.	35.00	200,000	968,039	880,008
D., W. D. & Tfr. ....	.40	.....	1,018,170	910,697
Gt. No. Ry.	2,049.93	78,268,492	134,823,938	107,074,102
M. C. & F. D. Ry.	27.30	3,237,425	1,625,205	772,072
M. Tfr. Ry.	12.50	.....	5,777,987	2,873,283
M. & I. Ry.	174.47	2,645,000	4,944,057	3,966,308
M. E. Ry. ....	.95	.....	969,164	897,460
M., St. P. & Ste. M. R.	539.57	18,255,913	20,992,511	21,990,682
M. & St. L. R. R.	378.46	20,884,936	21,845,196	16,622,245
M. W. Ry.	2.63	.....	7,773,750	4,321,249
N. W. Ry.	1.69	.....	1,745,899	1,078,831
No. Pac. Ry.	967.09	55,898,480	86,817,468	69,397,955
St. P. W. D. ....	.56	.....	5,495,150	4,354,201
Wsc. Cent. Ry.	23.60	1,235,380	4,238,241	2,780,323
W., M. & P. Ry.	244.03	10,539,656	11,959,545	6,561,652
Illinois Cent. R. R.	30.17	1,172,647	819,544	944,301
Totals.	7,596.43	\$334,979,692	\$500,675,780	\$411,735,194
Average per mile. ....	.....	\$44,206	\$65,909	\$54,201
Average per mile carrying roads. ....	.....	.....	\$63,065	\$52,430

Here it will be seen that the state's estimate of the cost of reproducing the railways of Minnesota, while 17.76% below the owner's

estimate is still \$8,224 per mile, or 18.80% above the average capitalization of the carrying roads, although that capitalization really covers the investment in the terminal and switching roads.

If the valuations in Minnesota and Washington, made by none too friendly commissions, are any criterions of what a national valuation made under presumably unbiased federal authority would be, the present cost to reproduce the railways of the United States would be nearer \$20,000,000,000 than any sum within the anticipations of those agitating for such valuation.

VII

OWNERSHIP OF AMERICAN RAILWAYS

Since 1905, when the Interstate Commerce Commission reported to the Senate that there were 327,851 stockholders of record at the date of the last election of directors prior to June 30, 1904, there has been no official estimate of the number of stockholders in the railways of the United States. No approximation has ever been attempted as to the ownership of railway bonds, which owing to their availability as investments by estates and trustees have a much wider distribution than stocks.

Of the 351 roads reporting to this Bureau for 1908, 315 returned 315,727 stockholders as of record at the date of the last election of directors prior to June 30th of that year. This was an increase of 74,173 over the total for practically the same roads in 1907, and of 88,741 over the total in 1906. As these companies own only 79% of the mileage they operate, and 13,500 miles of line are not represented in these reports at all, it is safe to estimate the number of stockholders in all the railways of the United States at approximately 430,000. This would give a little less than an average of two stockholders to every mile of line—a ratio which is steadily increasing.

In its revised blanks for the year 1908, the Commission called for a statement of the "ten largest holders of voting securities" of the reporting roads. The returns from 72 companies have been made public, and an analysis of these shows that—except where a controlling number of shares is held by accumulation in the hands of a voting trust, or by a trust company, or in the name of some individual for some other railway company, or directly by another railway company—nowhere do the "ten largest holders of voting securities" own a majority or an approach to a majority of the controlling stock.

For instance, of the \$117,792,000 constituting a majority of the stock of the Southern Pacific Railroad in the hands of the ten largest holders, no less than \$89,368,000 is held by trustees for the Oregon Short Line Railroad Company. In turn, practically the whole of the stock of the Oregon Short Line is held by a trustee for the Union

Pacific Railroad Company, whose ownership is distributed among over 14,000 stockholders, scattered in every investing market in the world. Of the Union Pacific \$195,679,900 common stock only \$43,631,100 is held by the ten largest holders, and of this more than three-quarters is held by trustees. Directly and indirectly counting its own stockholders and those of the Union Pacific there are nearly 20,000 owners of the Southern Pacific.

Take another instance: The published returns of the Pennsylvania Company give the Pennsylvania Railroad Company as owning all but \$6,850 of its \$60,000,000 capital stock. But turning to the returns of the latter company it appears that its ten "largest holders of voting securities" hold only \$17,846,950 of the total \$314,000,000 outstanding and the largest individual stockholder among these holds only \$4,320,050, while of the other nine, five are trustees or estates. At last accounts there were nearly 60,000 stockholders in the Pennsylvania Railroad Company, to say nothing of the stockholders in its lessor companies.

Such facts, which are aside from the purpose of the Commission in gathering statistics relative to the ten largest holders of railway securities in each company, are contributory to the great central fact that ownership of American railways is in the hands approximately of one million investors in their stocks and bonds. Their control is delegated to a few chief executives who are responsible for results, but who no more own the railways than the President, Congress, and the Supreme Court own the United States, because, for the time being, they have been entrusted with the executive, legislative, and judicial functions of government by their 15,000,000 fellow voters.

The railways are in some respects a great industrial republic wherein the suffrage is not confined to the one million holders of securities, but is shared in no ineffective degree by over a million and a half employees. How effective is the influence of the last named citizens of the railway republic may be judged from the fact that in 1906-07 they imposed an annual prior lien on railway revenues of \$100,000,000 — equivalent to the issue of \$2,000,000,000 five per cent bonds — without protest or regulation of federal or state authorities.

VIII

PUBLIC SERVICE OF RAILWAYS

The next and by all odds the most important inquiry as to American railways, is into the extent and efficiency of their public service. This and not the weekly and monthly reports of their earnings or the daily figures on the stock ticker is the true touchstone by which railway management in the United States is entitled to be judged. To see that this service is adequate, on equal terms to all, and at reasonable rates is the true province of regulation, whether by the states or by national authority.

PASSENGER TRAFFIC.

Although the moving of freight with certainty and dispatch, at rates as low as they can possibly be made without crippling the service, is the first great desideratum in railway working in America, for upon it the entire social and industrial well-being of the nation depends, all statistical records give precedence to the passenger traffic. The salient features of this service is briefly set forth in the following statement in which the returns to this Bureau for 1908 are compared with the final official returns for the preceding year :

	1908 Bureau Figures	1907 Official Figures
Miles of line represented.....	216,460	227,455
Passengers carried.....	854,255,337	873,905,133
Passengers carried 1 mile.....	28,680,516,000	27,718,554,030
Passenger revenue.....	\$554,234,180	\$564,606,343
Mileage of passenger trains.....	485,666,234	509,328,042
Average number of passengers in train.....	59	51
Average passenger journey (miles).....	32.57	31.72
Average receipts per passenger mile (cents).....	1.932	2.014

This table furnishes unmistakable proof of the heavy loss in railway revenues directly due to legislative limitation of passenger fares in twenty-two states. Notwithstanding the fact that this legislation has been declared unconstitutional in several states and has been temporarily enjoined in others, its general effect has been to reduce

receipts per passenger mile from 2.014 cents in 1907 to 1.932 in 1908. Applied to the passenger mileage of 1908 reported to this Bureau the loss is shown in the following statement:

Passengers carried 1 mile, 1908.....	23,680,516,000 at 2.014 = \$577,625,590
Passengers carried 1 mile, 1908.....	23,680,516,000 at 1.932 = 554,234,182
Decrease due to difference in rates	23,391,412

By consulting the table on page nine the reader will perceive that the total passenger revenue for all the railways of the United States for the year 1908 is given as \$566,905,108, an increase of only \$2,298,755, or 4/10 of one per cent, over 1907, whereas the service rendered computed from the passenger mileage of 216,460 miles of line increased 6.5%. In brief, had the passenger traffic conditions of 1907 prevailed in 1908 the passenger revenues would have been approximately \$600,000,000 instead of \$566,905,108. The failure to receive the thirty odd million dollars' difference for services actually rendered and expenses incurred was one of the contributory causes of the business depression of 1907-08.

There is no warrant for attributing this loss to the business depression. Neither is there reason to credit the maximum fare legislation with having stimulated passenger traffic.

In New England, where they have had no two-cent legislative stimulant and where the average passenger revenue for years has been in the neighborhood of 1.71 cents per mile, passenger traffic increased 7% in 1908 over 1907, or almost precisely the same relative increase as for the preceding year.

In discussing the effects of the business depression of 1907-08, the New Hampshire Railroad Commission has this to say:

"The volume of railroad traffic is at any time the best index of business conditions, with the exception, for a few weeks after any happening which stops the wheels of industry, deprives wage workers of employment, and curtails the output of factories and shops, freight receipts fall off rapidly, but workmen having leisure time travel more than usual, visiting, seeking work, and attending to their affairs away from home, and passenger receipts increase rather than diminish. But in a short time this changes, and both departments show about the same ratio of shrinkage."

A comparative table of passenger revenues by months which the Commission prints supports this view — the receipts showing an increase of 5% until March, 1908, when they gradually change to a

decrease. After the close of the fiscal year this decrease becomes more marked.

PASSENGER TRAFFIC 1908-1888.

The claim that passenger travel has not been materially stimulated by two-cent legislation finds further support in the following statement of passenger traffic for the twenty years ending June 30, 1908:

	Passengers Carried (millions)	Passengers Carried 1 Mile (millions)	Mileage Passenger Trains (millions)	Average Passengers in Train	Average Journey Miles	Passenger Revenue (millions)	Average Receipts per Passen- ger, Mile (cents)
1908	879	29,540	500	59	33	570	1.933
1907	873	27,718	509	51	32	564	2.014
1906	797	25,167	479	49	31	510	2.003
1905	738	23,800	459	48	32	472	1.962
1904	715	21,923	440	46	31	444	2.006
1903	694	20,915	425	46	30	421	2.006
1902	649	19,689	405	45	30	392	1.986
1901	607	17,353	385	42	29	351	2.013
1900	576	16,038	363	41	28	323	2.003
1899	523	14,591	347	41	28	291	1.978
1898	501	13,379	334	39	27	267	1.973
1897	489	12,256	335	37	25	251	2.022
1896	511	13,049	332	39	26	266	2.019
1895	507	12,188	317	38	24	252	2.040
1894	540	14,289	326	44	26	285	1.986
1893	593	14,229	335	42	24	301	2.108
1892	560	13,362	317	42	24	286	2.126
1891	531	12,844	308	42	24	281	2.142
1890	492	11,847	285	41	24	260	2.167
1889	472	11,553	277	42	25	254	2.199
1888	412	10,101	252	40	24	237	2.349
Increase 1888 to 1907	113 =	192%	99%	47%	37%	140%	

Decrease in average receipts per passenger mile 1888 to 1907.....17.7

With the average receipts per passenger mile since 1888 in mind, it is instructive to remember that the Official Statistician, between the years 1888 and 1893 made the following computations of the average cost of carrying one passenger one mile for the whole United States:

	1888	1889	1890	1891	1892	1892
Average cost of carrying a passenger one mile, cents	2.042	1.993	1.917	1.910	1.939	1.955

It will be noted that in no less than 14 years the average receipts per passenger mile were below the estimated cost of carrying one passenger in 1888, and in five instances it was below the official estimate for 1889. This is all the more noteworthy in view of the enormous increase in the cost of passenger service in track, equipment, power, comfort, conveniences, and terminal facilities. Such costly work as that involved in the new passenger stations in New York, Boston, Washington, Philadelphia, St. Louis, Kansas City, and Chicago are merely spectacular illustrations of the efforts of the railways to meet the public demands for improved passenger facilities.

The column of average passenger journeys reflects to a certain degree the effect of the serious competition the steam railways are meeting in every quarter where there is sufficient density of population to encourage the construction of electric lines. This competition is naturally most seriously felt in suburban commutation territory.

FREIGHT TRAFFIC.

In no other country of first importance in the world, except Russia, does the freight traffic bear such a preponderating relation to railway traffic as in the United States. This is clearly set forth in the following statement of the ratios of the passenger and freight earnings in the countries named according to the latest available statistics:

PROPORTION OF FREIGHT AND PASSENGER EARNINGS TO TOTAL EARNINGS IN THE UNITED STATES AND FOREIGN COUNTRIES.

	Year	Freight per cent	Passenger per cent	All Other per cent
United States of America.....	1907	70.44	21.81	7.75
German Empire a.....	1907	65.22	27.20	7.58
United Kingdom.....	1907	50.35	41.94	7.71
France.....	1906	53.64	44.51	1.85
Russia in Europe.....	1904	73.31	17.69	9.00
Austria.....	1906	71.77	24.81	3.42
Hungary.....	1906	70.15	26.63	3.12
Belgium.....	1906	67.14	30.92	1.94
Sweden.....	1905	64.23	32.00	3.77
Switzerland.....	1906	52.63	43.02	4.35
Canada.....	1907	65.26	31.16	3.58

a In Germany freight receipts include express and mail, as is also the case in Austria, Hungary, and Belgium.

Were it not that our freight rates are so much below those of other

countries, the disproportion between the ratio of earnings shown in the above table would be 50% greater.

In 1907 the railways of the United States carried 236,600,000,000 tons of freight one mile where in the same year the railways of Europe, including the British Isles, carried approximately 110,000,000,000 tons one mile. For their service the latter received \$1,400,000,000, while the former received \$1,823,000,000, or only \$432,000,000 more for more than double the service.

FREIGHT TRAFFIC 1908 AND 1907.

In the following statement the significant items of the freight traffic in 1908 for the roads reporting to this Bureau are compared with those of the final returns for the preceding year:

Year	1908 Bureau Figures	1907 Official Figures
Miles represented.....	216,460	227,455
Number of tons carried.....	1,435,026,663	1,796,336,659
Tons carried 1 mile.....	217,669,035,000	236,601,390,103
Freight revenue.....	\$1,623,191,774	\$1,823,651,998
Mileage of freight trains.....	580,325,414	629,995,723
Average number of tons in train.....	375.29	357.35
Average haul per ton.....	151.68	131.71
Average receipts per ton mile.....	7.46	7.59

Supplemental to the work apportioned between the passenger and freight services was a mixed train mileage of 32,111,134 miles in 1907 and 31,701,634 in 1908, making a total revenue train mileage of 1,171,922,997 in 1907, against 1,097,693,282 in 1908. The earnings from express and mail business are given elsewhere, being included in the returns under "Total Passenger Service Train Revenue." The totals for 1908 are within 3% of representing the aggregate railway business of the country for that year.

On its face the last table reveals where and how the depression of 1907-08 affected the railways. There was no increase in traffic, as in the case of the passenger service, to partially make good a decline in average receipts.

As the above statements of passenger and freight results in 1908 represent all the principal systems, but are exclusive of some 13,540 miles, consisting mostly of minor roads of less than 50 miles of line each, they will show slight discrepancies from the final returns. The mean haul and journey, and passengers and ton load per train for

the whole country will be lower, and the average receipts per passenger and ton mile slightly higher.

For practically the same roads reporting to this Bureau in 1907 the passenger mile rate was 2.010 cents and the ton mile rate 7.48 mills, against 1.932 cents and 7.46 mills in 1908.

FREIGHT TRAFFIC 1908-1888.

The salient features of the freight traffic of American railways since the Interstate Commerce Commission began compiling statistics is shown in the next summary:

SUMMARY OF TONS CARRIED, TON MILEAGE, MILEAGE OF FREIGHT TRAINS, AVERAGE TONS IN TRAIN, FREIGHT REVENUES AND AVERAGE RECEIPTS PER TON MILE.

Year	Tons Carried (millions)	Tons Carried One Mile (millions)	Mileage Freight Trains (millions)	Average Tons in Train	Average Haul per Ton (miles)	Freight Revenue (millions)	Receipts per Ton Mile (cents)
1908	21,478	222,022	597	372	150	\$1,671	.753
1907	1,796	236,601	629	357	131	1,823	.759
1906	1,631	215,877	594	344	132	1,640	.748
1905	1,427	186,463	546	322	130	1,450	.766
1904	1,309	174,522	535	307	133	1,379	.780
1903	1,304	173,221	526	310	132	1,338	.763
1902	1,200	157,289	499	296	131	1,207	.757
1901	1,089	147,077	491	281	135	1,118	.750
1900	1,081	141,596	492	270	130	1,049	.729
1899	943	123,667	5507	243	131	913	.724
1898	863	114,077	503	226	132	876	.753
1897	728	95,139	464	204	130	772	.798
1896	765	95,328	479	198	124	786	.806
1895	696	85,227	449	189	122	729	.839
1894	638	80,335	446	179	125	699	.860
1893	745	93,588	508	183	125	829	.878
1892	706	88,241	485	181	124	799	.898
1891	675	81,073	446	181	120	736	.895
1890	636	76,207	435	175	119	714	.941
1889	539	68,727	383	179	127	644	.922
1888	480	61,329	348	176	128	613	1.001
Incre 1907	ase 1888 to 273%	286%	80%	103%	2%	197%	

Decrease in average receipts per ton mile, 1888 to 1907.....24%

(a) Figures for 1908 computed on basis of returns to this Bureau.

(b) Includes 75% of mixed train mileage, that being the practice prior to 1900.

The seeming miracle of this table in which the remuneration of the railways has only increased 197%, where their services have increased 286% hangs upon the column which shows an increase of over 100% in the train load. Behind the fact lie the millions irrevocably invested in reconstructing the plant and equipment and the

tireless energy of all departments of railway service from executive head to track walker.

The roadbeds, rails, locomotives, and cars of 1888 could no more have moved the American tonnage of 1908 than could the combined equipment of all the railways of Europe move it to-day.

Amazing as is the testimony of this table to the physical performance of American railways, its record on the economic side is even more so. The columns showing that the haul per ton during the entire period has averaged between 119 and 135 miles with a variation of only 3 miles between the averages of 1888 and 1907 renders the decrease of 24% in average receipts per ton mile the crowning achievement of American railways.

PROPORTION OF COMMODITIES MOVED 1899 TO 1907.

The latest statistics available continue to demonstrate that there has been no return to the high water preponderance of low grade freight carried that accompanied and accounted for the low record of average receipts per ton mile in 1899 and 1900. This may be seen in the percentages of commodity tonnage moved since the information has been compiled by the Commission in the following statement:

SUMMARY SHOWING PERCENTAGE OF FREIGHT TRAFFIC MOVEMENT BY CLASSES OF COMMODITIES, 1907 TO 1899.

Year	Low Rate Freight Percentage of Aggregate					High Rate Freight Percentage of Aggregate			
	Products of Agriculture	Animals	Mines	Forest	Total	Manufacturers	Merchandise	Miscellaneous	Total
1899.....	11.33	3.12	51.47	10.89	76.81	13.45	4.49	5.25	23.19
1900.....	10.35	2.87	52.59	11.61	77.42	13.41	4.26	4.91	22.58
1901.....	10.76	2.91	51.67	11.67	77.01	13.75	4.16	5.08	22.99
1902.....	9.23	2.64	52.36	11.64	75.87	14.49	4.37	5.27	24.13
1903.....	9.56	2.63	51.56	11.67	75.42	14.39	4.69	5.50	24.58
1904.....	9.59	2.74	51.56	12.53	76.42	13.41	4.83	5.34	23.58
1905.....	9.03	2.54	53.59	11.24	76.40	13.60	4.32	5.68	23.60
1906.....	8.56	2.32	53.09	11.24	75.21	14.81	4.06	5.92	24.79
1907.....	8.62	2.29	53.39	11.38	75.68	15.41	3.89	5.02	24.32

It will be perceived that the proportion of manufactures moved in 1907 was the highest during the period since the records have been kept.

CAR SERVICE OPERATIONS.

In a sense complementary to the evidence of business depression shown in the statistics of surplus cars during the calendar year 1908, given on a preceding page, is the following comparative statement of the number of cars handled by the various car service associations of the United States in 1908 to 1904:

COMPARATIVE SUMMARY OF CARS HANDLED BY CAR SERVICE ASSOCIATIONS
FOR TWELVE MONTHS ENDING DECEMBER 31, 1904, TO 1908.

Name of Association	Twelve Months Ending December —				
	1904	1905	1906	1907	1908
	<i>Cars</i>	<i>Cars</i>	<i>Cars</i>	<i>Cars</i>	<i>Cars</i>
Alabama	708,680	752,982	744,548	779,402	631,487
Baltimore and Washing- ton	638,972	721,428	740,903	735,103	640,074
Central New York	556,808	611,601	645,861	753,269	738,054
Central (St. Louis)	817,232	863,788	908,096	919,130	838,017
Chicago	1,846,053	2,166,910	2,251,763	2,282,191	2,161,767
Cincinnati	607,000	675,117	748,763	771,990	635,365
Cleveland	556,117	640,364	796,687	1,016,003	715,764
Colorado	377,440	425,140	455,540	445,900	385,260
Columbus	323,770	394,152	443,638	469,773	363,130
East Tennessee	299,942	320,855	358,733	388,066	293,597
Indiana	771,481	912,827	962,941	1,104,855	1,077,786
Intermountain	96,353	116,533	158,231	184,577	153,885
Lake Superior	322,586	332,633	371,312	415,642	338,109
Louisville	499,156	495,095	541,945	506,528	518,955
Memphis	220,881	235,569	258,316	255,169	239,156
Michigan	620,728	687,428	766,950	838,928	696,926
Missabe Range	119,857	30,241	37,613	42,786	42,930
Missouri Valley	1,379,672	1,538,087	1,665,882	1,910,139	1,606,758
Nashville	289,329	300,602	336,110	351,572	326,385
New York and New Jer- sey	918,369	997,304	1,100,067	1,409,161	1,248,609
North Carolina	330,902	357,474	374,710	407,257	404,334
Northeastern Pennsyl- vania	700,509	802,072	836,443	917,936	633,655
Northern	1,249,724	1,467,041	1,722,345	1,736,981	1,515,706
Pacific	591,139	761,382	972,398	1,166,886	1,147,345
Pacific Northwest	575,197	647,726	727,474	888,093	845,405
Philadelphia	1,678,298	2,056,744	2,218,755	2,326,723	1,921,142
Pittsburg	2,417,938	3,375,530	3,295,463	2,935,299	1,977,891
Southeastern	789,207	813,444	862,379	853,720	823,948
Southern	213,398	273,273	301,273	492,914	513,438
Texas	843,101	932,992	977,630	986,475	1,118,622
Toledo	260,864	262,875	312,329	530,617	383,870
Virginia and West Vir- ginia	679,280	818,915	866,861	893,905	778,940
Western New York	757,509	812,409	881,640	986,962	806,488
Western (Omaha)	480,546	622,868	718,872	770,470	733,346
Wisconsin	1,148,404	1,157,036	1,119,326	1,118,720	1,022,270
Total reported by 35 associations	24,586,442	28,380,437	30,490,797	32,593,142	28,278,414

(a) Began operations in April — cumulative total of nine months.

It will be perceived that fewer cars were handled in 1908 than in any year since 1904, and this in spite of an increase of 366,486 cars for December, 1908, over the corresponding month in 1907.

This table shows a decrease of 15% in the freight cars handled by the car service associations reporting for the calendar year 1908 compared with the preceding year and of 7% when compared with 1906.

It may be remembered that the revenue loss of the railways for the year ending November 30, 1908, was found to be in excess of 12%.

IX

EARNINGS AND EXPENSES

Having in the preceding pages set forth the means — furnished by capital and labor — the financial, mechanical, muscular, and mental instrumentalities devoted to railway service in the United States, and the vast proportions to which that service has grown, it is next in order to present a review of their annual earnings and expenses. As they not only tell the tale of railway prosperity or adversity, but reflect the general trend of all business in the United States, these are the figures given the earliest publicity by financial journals and the Interstate Commerce Commission.

It is unfortunate that the spirit of innovation for innovation's sake has introduced so many changes in the form of keeping the "Income Account" that anything like a strictly accurate comparison in the year 1908 with 1907, or any preceding year, is impracticable. Therefore in preparing the next summary, which, as the Official Statistician says, "is such an income account as would have resulted from the actual operations had such operations been conducted by a single corporation," no attempt has been made to follow the changes of 1908. Rather the reports of 1908 are made to conform as nearly as possible to the forms of 1907, and so are comparable with the successive income accounts in previous official Statistics.

Next year, per force, the comparison will be made with such "Income Account" as the Statistician evolves out of the forms adopted for 1908, which, however, the public is advised, will not be uniform with those issued for 1909.

It is proper to state, however, that the data in the Income Account for 1908 is summarized from the actual returns, which, it may be repeated, cover over 97% of the operations of all the roads represented in the preliminary figures for the year compiled by the Interstate Commerce Commission from the monthly returns of the railways.

**COMPARATIVE INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED STATES,
CONSIDERED AS A SYSTEM FOR THE YEARS ENDING
JUNE 30, 1908 AND 1907.**

Item	Amount			
	1908		1907	
Passenger revenue.....	\$554,286,180		\$564,606,343	
Mail.....			50,378,964	
Express.....			57,332,931	
Other passenger service earnings.....			12,674,899	
Freight revenue.....	1,624,453,926		1,823,651,998	
Other freight service earnings.....			6,113,648	
Other earnings from operation (see Note a).....	175,933,222		74,346,795	
Gross earnings from operation.....		\$2,354,673,328		\$2,589,105,578
Operating expenses.....	1,637,173,322		1,748,515,814	
Taxes.....	77,416,376		80,312,375	
Salaries and maintenance of leased lines.....			648,835	
Total.....		1,714,589,698		1,829,477,024
Net earnings from operation.....		640,083,630		759,628,554
Income from other sources (see Note b).....		66,137,446		60,626,333
Net earnings and income.....		706,221,076		820,254,887
Net interest on funded debt..	282,354,000		323,733,751	
Interest on current liabilities	31,835,708		16,671,532	
Rent paid for lease of road (see Note c).....	113,529,261			
Additions and betterments charged to income account	30,312,240			
Other deductions.....	64,669,546			
Total deductions.....		522,700,755		340,405,283
Available for dividends, adjustments and improvements.....		183,520,321		479,849,604
Net dividends.....		104,074,006		227,394,962
Surplus available for adjustments.....		79,446,315		252,454,642

(a) The returns to this Bureau do not separate the earnings from mail, express, etc. The total of \$175,933,222, therefore, should be compared with \$200,847,237, the sum of these items in 1907.

(b) This figure in the official statistics for 1907 represents only "clear income from investments." The gross "income from other sources" that year was \$286,583,942, "which," in the language of the Official Statistician, "swells the gross income to a wholly fictitious figure."

(c) In 1907 the amount paid by the operating companies under this head was \$128,072,924, and was evidently deducted from income from other sources. It does not otherwise figure in the income account.

(d) Note to item in official statistics — "This amount comprises the following items: Permanent improvements, \$38,552,890; advances to cover deficits in operation of weak lines (estimated) \$5,000,000; miscellaneous deductions, \$67,578,488; surplus, which is shown in summary on page 89, \$141,323,264." It is this surplus which is inflated by dealing in duplicates and fictitious figures. The corresponding item for 1908 comprises appropriations to reserves, \$16,345,779; miscellaneous, \$5,933,021, and surplus covering deficits of weak lines and corporate losses, \$57,167,515.

Analysis reveals that this "Income Account" purporting to deal with net figures disposes of approximately \$60,000,000 income annually which is foreign to the transportation of passengers and goods. The earnings and expenses, rates, and services of the railways as public carriers have nothing to do with it. These are represented in the aggregate earnings which are derived from the services which the railways sell under the regulation of state and federal authorities. The introduction of "income from other sources" swells the totals with duplications, intercorporate payments, and consequent deductions, that obscure the true facts and befog what the statistician calls "general discussion."

It will be observed that if "income from other sources" in 1908 be deducted from the "surplus available for adjustments," it leaves only \$13,308,869 as the legitimate balance to the profit and loss account of this mighty industry.

In 1908 no less than \$198,644,744 were received by the railways reporting to this Bureau in interest and dividends to be paid out again in interest and dividends, thus swelling the latter in the public eye by just so many fictitious and immaterial millions.

Whatever may be the bookkeeping tale of this "Income Account," its chief interest for the public lies in the source and distribution of the earnings of operation. The service rendered, and so the source of these earnings, has been discussed above, and the same is partly true of their distribution.

How the gross earnings (\$2,354,673,328) of the railways reporting in this Bureau were actually distributed may be stated in tabular form thus:

Operating expenses.....	\$1,637,173,322	69.54%
Taxes including \$6,500,000 paid out of rents.....	83,163,376	3.56%
Betterments, reserves and losses.....	103,114,325	4.38%
Net interest, dividends and rentals.....	505,957,014	21.48%
Surplus and miscellaneous.....	24,512,281	1.04%
Total.....	\$2,354,673,328	100.00%

From the above it will be seen that the return on the net capital of \$12,803,834,164 invested in the 350 operating roads reporting in this Bureau was only 3.95%; whereas the rental represented in that capital was capitalized at 5%.

DISTRIBUTION OF GROSS EARNINGS IN 1907.

An analysis of the official report for 1907 shows that in the year of their greatest prosperity the gross earnings of the railways of the United States was distributed as follows:

STATEMENT OF DISTRIBUTION OF GROSS EARNINGS IN 1907 COMPARED WITH PERCENTAGES FOR 1906 AND 1905.

Gross Earnings, 1907, \$2,589,105,578.

Item	Amount 1907	Per Cent 1907	Per Cent 1906	Per Cent 1905
Pay of employees (1,672,074).....	\$1,072,386,427	41.42	40.02	40.34
Fuel for locomotives.....	200,261,975	7.74	7.33	7.51
Water, oil and supplies for locomotives.....	22,723,359	.88	.85	.86
Taxes.....	80,312,375	3.10	3.22	3.05
Permanent improvements.....	38,552,890	1.50	2.11	1.81
Miscellaneous deductions (additions, betterments, etc.).....	67,578,488	2.61	3.32	2.56
Deficits in operating weak lines (note a)	5,000,000	.19	.22	.24
Material for.....				
Locomotive renewals and repairs..	52,520,000	2.03	2.24	2.40
Passenger cars renewals and re- pairs.....	13,490,000	.52	.61	.77
Freight cars, renewals and repairs..	63,640,000	2.46	2.57	2.45
Other equipment, renewals and re- pairs.....	4,123,000	.16	.....	.....
Bridges, renewals and repairs.....	17,314,000	.67	.75	.82
Rails, renewals and repairs.....	17,500,000	.68	.81	.63
Ties, renewals and repairs.....	27,600,000	1.07	1.14	1.20
Ballast and repairs to roadway....	31,000,000	1.12	1.05	1.06
Buildings, renewals and repairs....	19,000,000	.73	.73	.77
Other way and structures, renewals and repairs.....	7,355,000	.28	....	....
Hire of equipment, car per diem mileage etc.....	28,395,307	1.10	.94	1.05
Rents for tracks, yards and terminals..	30,040,166	1.16	1.16	1.15
Rents of buildings and other property	5,265,663	.20	.22	.23
Train and station supplies.....	38,433,826	1.48	1.43	1.49
Repairs and renewals, shop machinery.. and tools.....	11,467,941	.44	.45	.44
Loss and damage.....	25,796,083	1.00	.91	.95
Injuries to persons.....	21,462,504	.83	.75	.77
Law expenses.....	7,484,939	.29	.30	.34
Stationery and printing.....	15,975,211	.61	.59	.59
Advertising.....	7,241,641	.28	.28	.24
Outside agencies.....	22,336,776	.85	.90	.95
Insurance.....	8,153,618	.31	.32	.33
Miscellaneous expenses.....	22,254,206	.85	1.07	.96
Interest on funded debt.....	323,733,751	12.50	13.63	14.67
Interest on current liabilities.....	16,671,532	.64		
Dividends.....	227,394,962	8.78	9.14	9.04
Surplus.....	36,639,938	1.42	.94	.31
Total gross earnings, 1907.....	\$2,589,105,578	100.00	100.00	100.00
Total gross earnings, 1906.....	2,325,765,167			
Total gross earnings, 1905.....	2,082,482,406			

(a) According to the returns to this Bureau this item in 1907 was \$13,294,108.

DISTRIBUTION IN 1908.

While the returns to this Bureau do not include the details given in the foregoing statement, they afford the following information as to several of its salient features:

Item	Amount, 1908 216,460 Miles Represented	Per Cent 1908	Per Cent 1907	Per Cent 1906
Pay of employes (1,395,512).....	\$1,020,990,246	43.36	41.42	40.02
Taxes.....	83,916,376	3.56	3.10	3.22
Additions and betterments.....	30,312,240	1.28	1.50	2.11
Interest on funded debt and current liabilities.....	314,189,708	13.34	13.14	13.63
Dividends.....	104,074,006	4.42	8.78	9.14
Totals.....	\$1,553,482,576	65.96	70.94	71.64

(a) In 1907 and 1906 the dividends included large duplications paid out of dividends received.

X

TAXES

Business depression brought no recession of taxes to American railways. On the contrary, their burdens on this account grew heavier as their earnings decreased.

The 351 roads reporting to this Bureau paid \$77,513,526 in taxes in 1908. To this should be added \$6,500,000 paid indirectly through their lessor companies out of rentals and \$2,470,425, the estimated amount paid by the 13,450 miles of line not included in these returns.

It therefore appears that the railways of the United States paid approximately \$86,483,951 for taxes in 1908 — a sum greater than the annual receipts of all the railways of Australia with those of the government railways of New Zealand and Canada added.

How the first fixed charge on American railways has more than doubled absolutely and relatively during the past twenty years is shown in the following summary:

TAXES ANNUALLY AND PER MILE 1889 TO 1908.

Year	Taxes Paid	Taxes per Mile
1908 (estimated as above).....	\$86,483,951	376
1907 (official final figures).....	80,312,375	353
1906.....	74,785,615	336
1905.....	63,474,679	292
1904.....	61,696,354	290
1903.....	57,849,569	281
1902.....	54,465,437	272
1901.....	50,944,372	260
1900.....	48,332,273	250
1899.....	46,337,632	247
1898.....	43,828,224	237
1897.....	43,137,844	235
1896.....	39,970,791	219
1895.....	39,832,433	224
1894.....	38,125,274	216
1893.....	36,514,689	215
1892.....	34,053,495	209
1891.....	33,280,095	206
1890.....	31,207,469	199
1889.....	27,590,394	179

Since 1889 the tax charge on American railways has increased 213% absolutely and 110% per mile of line.

XI

PASSENGER FARES AND FREIGHT RATES

It is not surprising to find from the foregoing pages that the average receipts per passenger mile of the roads reporting to this Bureau decreased from 2.014 in 1907 to 1.932 in 1908 and that by reason of that decrease the railways suffered a loss of approximately \$30,000,000.

But it will be a surprise to the general reader to find that the average freight receipts for practically the same roads show a decline from 7.48 mills in 1907, to 7.46 mills in 1908. This decline of two one-thousandths of a cent figured on the tonnage transported by those roads meant a loss of approximately \$4,400,000 on the year's business.

The general reader was not prepared for this demonstration because of the enormous decrease in the carriage of coal and other low class freight in the East, and the continuous discussion of advances in freight rates in the press.

The decrease is accounted for, however, by the activity of the Interstate Commerce Commission in rendering decisions reducing freight rates. It is doubtful if the Commission itself realizes the full effect of the general trend of its work in this regard.

On June 21st last a Commissioner was authority for the statement that during the eighteen months the Hepburn law had been in effect 180, or one-half, of the cases decided involved orders lowering rates. Since that date to February 1, 1909, the Commission handed down 143 decisions, no less than 89 of which lowered the rates.

Thus of 503 decisions rendered by the Commission in 25 months, no less than 269, or 53% reduced existing rates and established lower rates for the net two years.

There were no decisions advancing rates.

Moreover, the cases decided represented only a small proportion of the complaints settled in anticipation of the seeming inevitable, in which the process of nibbling away the remunerative margin of railway rates has proceeded without intermission.

Nor do these figures include the recently decided Spokane case in which the principle of water competition is preserved in the language of decision but not in the order of the Commission.

XII

RAILWAY ACCIDENTS

Accident Bulletin No. 28 of the Interstate Commerce Commission furnishes the information for the following statement of the number of passengers and employees killed and injured on the railroads of the United States during the last two fiscal years:

SUMMARY OF CASUALTIES TO PERSONS IN RAILWAY ACCIDENTS FOR THE YEARS ENDING JUNE 30, 1908 AND 1907.

Class of Accident	1908				1907			
	Passengers		Employees		Passengers		Employees	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Collisions.....	.111	4,284	303	3,428	.209	4,733	567	4,608
Derailments.....	.54	3,057	260	2,065	.185	4,184	330	2,511
Miscellaneous train accidents, including locomotive boiler explosions....	.0	89	79	1,325	.16	153	114	1,605
Total train accidents.....	.165	7,430	642	6,818	.410	9,070	1,011	8,924
Coupling or uncoupling....	.....	.....	239	3,121	.....	.....	302	3,948
While doing other work about trains or while attending switches.....	.....	.....	206	15,991	.....	.....	310	17,711
Coming in contact with overhead bridges, structures at side of track, etc.	.4	37	110	1,353	.8	44	134	1,591
Falling from cars or engines or while getting on or off	.159	2,501	668	11,735	.162	2,113	790	12,65
Other causes.....	.78	2,677	1,493	17,326	.67	2,370	1,806	17,950
Total other than train accidents.....	.241	5,215	2,716	49,526	.237	4,527	3,342	53,765
Total, all classes.....	.406	12,645	3,358	56,344	.647	13,597	4,353	62,689

The marked recession in railway casualties shown in this statement reached its lowest point in the quarter ending June 30, 1908, when the record showed the smallest number of passengers and employees killed in train accidents in any quarter since monthly records were required under the Act of March 3, 1901. The summary for this quarter and for the corresponding quarter in 1907 is as follows:

**CASUALTIES TO PERSONS FOR THE THREE MONTHS ENDING JUNE 30, 1908
AND 1907.**

	1908		1907	
	Killed	Injured	Killed	Injured
Passengers:				
From accidents to trains.....	13	1,213	48	2,054
By accidents from other causes.....	44	1,309	63	1,137
Employees:				
From accidents to trains.....	99	1,064	202	2,070
Coupling or uncoupling.....	30	549	72	973
While doing other work about trains.....	16	2,742	76	4,243
Falling from cars or engines while getting on or off.....	127	2,058	194	3,024
Other causes.....	262	4,163	410	5,145
Total all classes.....	591	13,098	1,065	18,646

It will be observed that in the quarter ending June 30, 1908, less than 19% of the fatalities and less than 18% of the injuries reported were due to train accidents — the only accidents associated with railways in the public mind in “general discussions.”

ACCIDENTS TO OTHER PERSONS.

In the preceding summaries no mention is made of the accidents to persons other than passengers and employees, as the monthly reports deal exclusively with the latter classes. The annual reports, however, include casualties at highway crossings to trespassers, to persons walking along the track or sleeping on it, in shops remote from the railroad, and all other accidents directly or indirectly connected with the railway industry. Accidents to “other persons” include over 60% of all the fatalities charged against the railways. The returns to this Bureau for 1908 show the following casualties to persons other than passengers and employees during that year:

Class	Killed	Injured
Trespassers (including suicides).....	5,295	5,444
Not trespassing.....	810	2,855
Total other persons.....	6,105	8,299

These figures support the computation that the total number of

trespassers and other persons killed in railway accidents in the United States in 1908 was approximately 6,500 and injured 9,850. From which it appears that there was no such diminution of the number of casualties to other persons in 1908 as in the case of passengers and employees.

FATALITIES IN RAILWAY ACCIDENTS SINCE 1888.

Disregarding the figures as to injuries, which term covers casualties of altogether too indeterminate a nature for statistical purposes, the above estimate enables us to complete the following summary:

PASSENGERS, EMPLOYEES, AND OTHER PERSONS KILLED IN RAILWAY ACCIDENTS FROM 1888 TO 1908.

Year	Passengers	Employees	Other Persons		Total
			Trespassers	Not Trespassing	
1908.....	406	3,358	5,560	940	10,264
1907.....	647	4,353	5,612	1,044	11,656
1906.....	359	3,929	5,381	949	10,618
1905.....	537	3,361	4,865	940	9,703
1904.....	441	3,632	5,105	868	10,046
1903.....	355	3,606	5,000	879	9,840
1902.....	345	2,969	4,403	871	8,588
1901.....	282	2,675	4,601	897	8,455
1900.....	249	2,550	4,346	660	7,865
1899.....	239	2,210	4,040	634	7,123
1898.....	221	1,958	4,063	617	6,859
1897.....	222	1,693	3,919	603	6,437
1896.....	181	1,861	3,811	595	6,448
1895.....	170	1,811	3,631	524	6,136
1894.....	324	1,823	3,720	580	6,447
1893.....	299	2,627	3,673	647	7,346
1892.....	376	2,554	3,603	614	7,147
1891.....	293	2,660	3,465	611	7,029
1890.....	286	2,451	3,062	536	6,335
1889.....	310	1,972	Not given	*3,541	5,823
1888.....	315	2,070	given	*2,897	5,282

* Includes trespassers.

This table shows a reduction of 1,392 in the number of railway fatalities in 1908 compared with 1907. Of this gratifying decrease, no less than 1,236 were in passengers and employees.

In the matter of railway accidents it would be misleading to conclude that the millennium of safety in railway travel was approaching because of the great reduction in fatalities here seen. But the

following statement, comparing the record of accidents and traffic units for the five years ending with the years immediately after the panics of 1893 and 1907 affords a valuable line upon the relative trend of accidents and traffic under similiar conditions during periods a decade apart.

INCREASE IN ACCIDENTS, TRAFFIC, AND EMPLOYEES BETWEEN FIVE YEAR PERIODS ENDING JUNE 30, 1894 AND 1908.

	Average for Five Years		Increase	Increase per cent
	To June 30 1894	To June 30 1908		
Accident units:				
Fatalities to passengers....	316	490	174	55
Fatalities to employees.....	2,443	3,763	1,320	54
Fatalities to other persons..	4,102	6,260	2,158	52
Traffic units:				
Passenger mileage (millions)	13,274	25,629	12,355	93
Freight ton " (millions)	83,888	207,097	123,209	147
Number of employees.....	801,642	1,464,529	662,887	82

This table supplies proof that despite the sensational aggregates by which the public mind is inflamed and prejudiced, the measures adopted to prevent railway casualties have been effective to the extent of reducing fatalities relatively to the units of risk between 40% and 50%. Unfortunately for a just conclusion, the absolute increase in general discussions obscures the relative decrease. In such a question numbers outweigh the law of averages.

RELATION OF ACCIDENTS TO PASSENGER TRAFFIC.

The true relation of railway accidents to passenger travel in the United States, however, is most nearly seen in the following table of the number of passengers carried one mile to one killed in train accidents during the period for which statistics are available:

PASSENGERS CARRIED ONE MILE TO ONE KILLED.

Year	Passengers Killed in Train Accidents	Passengers Carried One Mile	Passengers Carried One Mile to One Killed
1908.....	165(a)	29,540,931,000	199,600,885
1907.....	410	27,718,554,030	72,802,600
1906.....	182	25,167,240,831	183,702,488
1905.....	350	23,800,149,436	68,000,427
1904.....	270	21,923,213,536	81,197,087
1903.....	164	20,915,763,881	127,535,745
1902.....	170	19,689,937,620	115,823,162
1901.....	110	17,353,588,444	157,759,894
1900.....	93	16,038,076,200	172,463,183
1899.....	83	14,591,327,613	175,799,127
1898.....	74	13,379,930,004	180,809,864
1897.....	96	12,256,939,647	127,676,454
1896.....	41	13,049,007,233	318,268,469
1895.....	30	12,188,446,271	406,281,542
1894.....	162	14,289,445,893	88,206,456
1893.....	100	14,229,101,084	142,291,010
1892.....	195	13,362,898,299	68,522,555
1891.....	110	12,844,243,881	116,765,853
1890.....	113	11,847,785,617	104,847,660
1889.....	161	11,553,820,445	71,762,859

(a) Of these only 148 were passengers in the ordinary sense of the term.

It cannot escape notice that the years of the greatest immunity from train accidents in the above table tread upon the heels of years of excessive mortality, and occur in years of depression after periods of prosperity.

THE PREVENTION OF RAILWAY ACCIDENTS.

In his inaugural address President Taft has said that he will "be glad whenever any additional reasonable safety device can be invented to reduce the loss of life and limb among railway employees, to urge Congress to require its adoption by interstate railways."

The broad thought behind this wish is shared by all who are interested in making railway employment as safe as it is efficient and exacting. But unfortunately it voices the prevailing American error that is responsible for the relative prevalence of accidents among railway employees in the United States, namely, a reliance on invention of devices rather than on the steady development of a higher sense of responsibility in all ranks of railway employees.

Safety appliances have been the broken reed whereon American railways have leaned so heavily "that it has gone into their hand and pierced it."

This justifies a consideration of the subject of railway accidents as far as they can be studied in statistics.

According to the first summary under this title, the business depression following 1907 may be credited with a white mark in the matter of preventing railway fatalities. At least 1,400 American citizens are alive to-day who with a continuance of the fierce rush of 1907 would almost inevitably have been sacrificed to the inexorable law of multiplying force. For half a century legislators, commissions, and railway companies have been working on mechanical contrivances to ameliorate the conditions of railway service in the United States. The adoption of automatic couplers and train brakes has become well nigh universal. Within fifteen years over 60,000 miles of line, or over one-quarter of the mileage of the Republic, has been put under the protection of the block signal system. Nowhere on earth have artificial appliances to shield railway traffic from the consequences of its own accelerating momentum been so generally adopted as in America.

But year after year the aggregate of railway casualties, with occasional recessions, has grown more startling, until in 1907, the year of our greatest industrial activity, with railway operations protected with safety devices as never before; with grade crossings being gradually eliminated or better guarded than ever before; with the public and railway managers more keenly alive to the situation than ever before—in the year 1907 the list of casualties reached the deplorable totals of 11,839 killed and 111,016 injured.

Against this harrowing record, due, as every practical railway official must acknowledge, to the feverish effort to comply with the feverish American demand that a freight traffic double that of all Europe shall be handled with ever-increasing haste—the record for 1908 comes like a gleam of life giving light. Great as is the contrast between the aggregates for the two consecutive fiscal years given above, the full effect of handling traffic without undue haste is only disclosed in the following table of fatalities in train accidents, as given in the quarterly bulletins for the years ending September 30, 1907 and 1908:

**FATALITIES TO PASSENGERS AND EMPLOYEES IN TRAIN ACCIDENTS DURING THE
YEARS ENDING SEPTEMBER 30, 1907 AND 1908.**

Bulletin	Passengers	Employees	Total
No. 22, December, 1906.....	180	294	474
No. 23, March, 1907.....	126	295	421
No. 24, June, 1907.....	48	202	250
No. 25, September, 1907.....	110	236	346
Total year to September 30, 1907.....	464	1,027	1,491
No. 26, December, 1907.....	21	199	220
No. 27, March, 1908.....	21	104	125
No. 28, June, 1908.....	13	99	112
No. September, 1908.....	53	138	191
Total year to September 30, 1908.....	108	540	648
Decrease.....	356	487	843
Decrease, per cent.....	76.7	47.4	56.5

Not since the business stagnation of 1894 and 1895 has there been such relative immunity from fatalities to both passengers and employees in train accidents as is shown in the second half of this table.

Remember that this decrease of over 76% in fatalities to passenger traffic was in no sense due to a decrease in the number of passengers exposed to the risk of railway travel. As a matter of fact railway travel increased 8%. Neither was it due to the adoption of any new safety devices or operative regulations. These remained practically the same in 1908 as in 1907.

Beyond question the comparative safety of railway travel in 1908 was due to three causes—the decrease of 7% in freight traffic, the reduction in the number of railway employees, and the consequently greater efficiency of operating forces.

As has been emphasized in previous reports of this Bureau, freight traffic plays a preponderating part in everything pertaining to American railways. In no respect is this more apparent than in the statistics of accidents. The death roll rises and falls as the strain upon this division of traffic is increased or relaxed. The freight traffic's responsibility for a vast majority of train accidents is clearly shown in the following analysis of the eighty "prominent collisions" in the Commission's quarterly Accident Bulletins for the year 1908:

KIND OF TRAINS IN COLLISIONS, 1908.

Kind of Train in Accident	Number of Collisions	Killed	Injured
Passenger and passenger	13	43	293
Freight and passenger.....	27	107	797
Freight and freight.....	40	40	127
Total.....	80	190	1,197

Here it will be observed that freight trains participated in no less than 83.7% of the accidents and 77% of the fatalities. It is a noteworthy fact that during the last quarter of 1908 there was only one prominent collision between freight trains.

The sharp decline in freight traffic in 1908 not only resulted in the laying off of 400,000 employees, but it obviated the necessity of taking on new and inexperienced men. During the six years preceding the panic the number of railway employees increased at the rate of over 100,000 a year. When the nature of railway employment is considered, it must be admitted that the task of breaking in such an army of recruits every year becomes more difficult under the pressure of rapidly increasing traffic. And there is no patent or royal road to the making of efficient railway employees.

The brief notes on prominent collisions and derailments that accompany the accident bulletins, meager and unsatisfactory as they are, support the contention that safety in railway travel and employment is to be sought not through mechanical contrivances, but through the sifting and schooling of men along lines of special fitness for the particular work required of them. Out of 665 reports examined, no less than 202 give negligence or error of some member of the train crew as the cause of the accident; 206 name recklessness, carelessness, overlooking or disregarding orders or taking chances; disobedience accounts for 52 accidents; incompetence and inexperience for 15; defect of equipment for 49, and defect of roadway for 20. No less than 19 of the prominent accidents were due to malicious acts, while 74 were caused by misadventure, cyclones, washouts, etc.

A study of accident statistics, extending now over five years, confirms the writer's belief that their control is a matter of men, and not mechanism. We have been multiplying laws and regulations and all sorts of artificial contrivances for the protection of railway traffic, and we have been neglecting the obvious training and discipline of the only force that has the remedy for accidents literally and

figuratively in its hands. And by discipline here is meant, not the discipline that punishes and penalizes, but the discipline that instructs, perfects, and rewards competence, obedience, and automatic vigilance.

Every artificial device that tends to relax or weaken the eternal vigilance that is the price of safety multiplies accidents. It was through the higher efficiency of the personal equation that the depression of 1908 effected such a gratifying contrast to 1907 in the matter of railway fatalities.

THE TEACHING OF BRITISH INVESTIGATIONS.

In official investigations of railway accidents and any authoritative diagnosis of their causes, we are as far behind Great Britain and Germany as we are ahead of them in the private initiative and physical facilities of transportation. Fortunately, in the absence of any trustworthy public inquiry into railway accidents in America, railway conditions in all countries have so much in common that we can draw general conclusions from the results of experience and expert investigations into the causes of railway accidents abroad. These, as carried on with an accumulation of expert knowledge and precedents, under the British Board of Trade are of the highest value in arriving at a practical view of this subject.

As presented in the general report to the Board of Trade, the following table shows the total number of persons killed and injured in the working of British railways during the calendar years 1907 and 1906:

	1907		1906	
	Killed	Injured	Killed	Injured
A. Passengers:				
From accidents to trains, rolling stock, permanent way, etc	18	534	58	631
By accidents from other causes	107	2,968	116	2,746
Total passengers	125	3,502	174	3,377
B. Employees:				
From accidents to trains, rolling stock, etc	13	236	13	140
By accidents from other causes	496	21,278	470	16,116
Total employees	509	21,514	483	16,256
C. Other persons:				
From accidents to train, rolling stock, etc.....	5	11	1	3
Persons passing over railways at level crossings	50	30	76	24
Trespassers (including suicides)	447	133	455	106
Persons not coming under above classification .	75	785	63	678
Total other persons	577	959	595	811
Grand total, all classes	1,211	25,975	1,252	20,444

Included in this grand total are 94 persons killed and 17,164 injured in accidents on railway premises unconnected with the running of trains or the movement of railway vehicles.

A change in the definition of what constitutes a reportable accident ordered in December, 1906, accounts for an increase of no less than 5,551 in the reported injuries. This illustrates the lack of uniformity that vitiates all statistics relating to injuries, and also the necessity for uniformity and continuity in all statistics.

Commenting on the casualties to passengers from other causes than train accidents, the report says, "they mostly arise from carelessness of the passengers themselves." The same is true of this class of accidents on American railways.

Of the accidents not connected with the movements of trains or railway vehicles, the report says, "the bulk of them were due to misadventure or pure accident for which no remedy could be prescribed."

CAUSES OF TRAIN ACCIDENTS.

During 1907 twenty-nine train accidents, in which 32 persons were killed and 210 injured, were investigated by the inspectors of the Board of Trade whose reports ascribed them to the following causes:

Failure of couplings.....	2
Defective maintenance of rolling stock.....	2
Defective construction of rolling stock.....	1
Insufficient or inadequately enforced regulations.....	1
Negligence, want of care, and mistakes on the part of servants of the railway company....	22
Excessive speed, having regard to engine, road or other circumstances.....	4
Foggy weather.....	8
Other doubtful causes.....	4

This table leaves no doubt as to where the chief responsibility for train accidents on British roads lies, and the reports for preceding years confirms its finding that negligence of some individual is responsible for four-fifths of such accidents. In analyzing the above table it should be remembered that in some cases more than one cause contributed to the accident.

Of fatalities to passengers not caused by train accidents 69% were due to "falling between trains and platforms," "falling off platforms and being struck or run over by trains," and "falling out of carriages during the running of trains." Of all this class of accidents the report says, "Most of these accidents are due to want of common care and caution on the part of the passengers themselves."

CAUSES OF ACCIDENTS TO EMPLOYEES.

During the year 1907 the assistant and subinspecting officers of the Board of Trade inquired into 816 accidents which involved fatal and other injuries to 926 persons, "nearly all of whom were railway employees." The results of these inquiries are given in the first column of the following table, and the second column classifies the accidents in which no formal inquiries were held:

	Inquired Into	Not Inquired Into
A. Misadventure or accidental.....	181	3,621
B. Want of caution or misconduct on the part of the injured person..	375	1,295
C. Want of caution or breach of rules on the part of employees other than the person injured.....	153	153
D. Defective system of working dangerous places and condition of work	82	6
E. Defective apparatus, want of appliances or safeguards, etc.....	32	89
F. Neglect or non-observance of rules under Railway Employment Act, 1900.....	18	13
Total.....	841	5,277

In its comment on this table the report says: "The figures in the second column may be somewhat less trustworthy than those in the

first because they are not based upon the results of independent inquiries. They may, however, be accepted as fairly accurate, since they represent the cases which were so clearly accounted for in the returns furnished by the railway companies as not to call for investigation. It is unlikely that inquiries into all these cases would have resulted in more than a slight shifting of figures among the first three heads of the classification. It is difficult to assign more than 240 of these cases to preventable causes. It will be observed that the accidents comprised under the first three headings which, so far as they are affected by rules, etc., may be called unpreventable, outnumber the preventable accidents 24 to 1."

In Great Britain, where automatic couplers are the exception, there were only 18 fatalities in coupling or uncoupling vehicles, as compared with 239 in the United States where automatic couplers are almost universal. In England seven fatalities were reported to men engaged in coupling "screw coupled" vehicles—all of which the report says "might have been avoided if the men had waited until the vehicles were at rest before attempting to go between them." Thus it appears that the same cause, undue haste, produces the same results there as here.

In connection with 891 inquiries held by officers of the British Board of Trade in 1907, recommendations were made in 403 cases with the following results: "In 345 cases the recommendations were adopted, in 38 they were not adopted, and in 20 cases they were still under consideration at the time of going to press."

OVERWORK SELDOM A CAUSE OF ACCIDENTS.

In the language of an English inspector of large experience, his observation "does not show any close connection between long hours and accidents"—a conclusion that is borne out by the following summary of British reports for four years, giving the hours employees were "on duty at time of accidents":

HOURS WHEN BRITISH ACCIDENTS OCCUR.

Three Months to	Off Duty	Hours on Duty when Accidents Occurred																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Sept. 30, 1907	1	18	24	22	18	17	23	16	18	17	16	15	11	3	1	...	...	...
Dec. 31, 1907	4	15	30	17	29	19	18	19	25	14	15	11	6	1	1	...	...	...
Mar. 31, 1908	..	18	23	30	19	18	22	20	15	18	13	15	10	2	2	...	...	...
June 30, 1908	1	9	26	14	19	23	18	17	12	14	13	12	8	2	4	...	...	...
Year 1908...	6	60	103	83	85	77	81	72	70	63	57	53	35	8	8	...	...	...
Year 1907...	1	70	86	78	78	71	64	59	48	68	62	43	35	14	12	5	3	1
Year 1906...	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	...	2
Year 1905...	3	52	74	65	54	71	66	59	48	53	56	41	37	7	3	3	...	1
Four years ..	16	234	327	296	303	282	292	258	236	255	236	179	146	46	27	11	3	4

Here is proof that out of 3,151 accidents investigated by British inspectors only interested in getting at the truth, a majority (55%) happened during the first half of the twelve hours for which a majority of the British railway employees are booked, and that less than 3% happened when men were working overtime. In none of these cases was the accident attributable to long hours.

In regard to the disastrous Shrewsbury derailment, in which eleven passengers were killed, its immediate cause was found to be excessive speed maintained in the face of danger signals, but how a sober, experienced, and physically sound "driver" approached Shrewsbury at such speed unless he "had a sudden attack of illness or a fit of some sort" has never been cleared up. Colonel H. A. Yorke, who conducted the investigation, was of opinion that the driver was dozing as he passed two signal boxes and only awoke to his danger when too late. The driver had 13 hours for rest before going on duty and had been with his train only 5½ hours at the time of the accident. In his report Colonel Yorke says: "In America accidents have frequently been found to be due to the engineman or men being asleep, but in England this has rarely, if ever, been recognized as the cause, or as a potential cause, of an accident."

It is doubtful if American enginemen will admit that railway accidents in this country are "frequently found" to be due to their sleeping on duty. If Colonel Yorke had used the words "sometimes claimed," he would have more nearly expressed the situation. Somnolence is more often suggested as an excuse than found as a potent cause of any accident traceable to the cab of an American locomotive.

RAILWAY ACCIDENTS IN GERMANY.

Our Consul-General, A. M. Thackera of Berlin, writes to the state department: "The various German railway administrations make thorough investigation of every wreck, little or big, and invariably some one is held responsible and punished for its occurrence." In their statistics, the German authorities are careful to distinguish between casualties which are due and not due to the victim's own imprudence. In the following table of fatalities on German railways during 1905, 1906, and 1907, which are exclusive of accidents in railway shops, this distinction is preserved:

	Killed		
	1907	1906	1905
Passengers:			
In accidents to trains.....	15	5	19
Other accidents:			
Without fault of their own.....	2	3	9
As a result of their own carelessness.....	118	110	91
Total passengers.....	135	118	119
Employees on duty:			
In accidents to trains.....	21	38	39
In other accidents:			
Through their own carelessness in trains or cars in motion.....	109	88	79
In making up trains.....	88	89	71
In coupling cars.....	118	106	97
While on tracks in way of moving cars or trains.....	292	312	226
Through other forms of carelessness.....	86	70	89
Total employees on duty.....	714	703	601
Other officials.....	9	13	12
Other persons:			
Trespassers including employees off duty.....	391	347	370
Suicides.....	309	276	283
Total other persons.....	700	623	653
Total all classes.....	1,558	1,457	1,385

If American statistics are restricted, as those of Germany are, to accidents occurring in connection with the movement of trains, engines, and cars, it would reduce the list of killed materially, while the exclusion of accidents in railway workshops would have reduced the totals for 1907 by 70 killed and 18656 injured.

RAILWAY ACCIDENTS IN EUROPE.

Excluding the returns of injured, because there is no common definition of what constitutes a reportable injury, the casualties on European railways, according to the latest reports, resulted in the following fatalities:

KILLED IN EUROPEAN RAILWAY ACCIDENTS.

Country	Year	Passengers	Employees	Other Persons	Total
United Kingdom.....	1907	125	509	577	1,211
Germany.....	1907	135	723	700	1,558
Russia in Europe.....	1904	126	446	1,060	1,632
France.....	1906	a 14	294	b 319	627
Austria.....	1906	12	101	100	213
Hungary.....	1906	26	126	167	319
Italy.....	1906-7	43	146	b 88	277
Spain.....	1903	57	40	115	212
Portugal.....	1904	...	....	....	55
Sweden.....	1905	8	33	64	105
Norway.....	1907	1	2	6	9
Denmark.....	1906-7	c 2	14	6	22
Belgium.....	1906	12	55	58	125
Holland.....	1906	2	28	30	60
Switzerland.....	1906	14	33	31	78
Roumania.....	1906-7	9	35	59	103
Total.....		586	2,575	3,400	6,606

(a) Train accidents only. Other accidents to passengers included under "Other Persons."

(b) Excluding suicides.

(c) Statistics cover state railways only.

In 1899, when the railway mileage in the United States was equal to that of the above European countries now, the total of railway fatalities was: Passengers, 239; employees, 2,210, and other persons, 4,040; aggregating 7,123. It is safe to estimate the suicides in France and Belgium at 500, which would bring the total in the above table practically level with the fatalities on the American railways in 1899. Only once in their history has the record of fatalities to passengers exceeded that of all Europe in the above table, and there would be no exception if the French returns included all manner of fatalities to passengers, as do those of the United States, Great Britain and Germany. This is doubtless due to the greater density of passenger traffic in Europe and the United Kingdom.

But it is also a fact that outside of Germany and Great Britain the reports of railway accidents in foreign countries are not nearly so exhaustive as they have been in the United States since 1901. In Russia, including Asiatic roads, in 1905 the fatalities reported were: Passengers, 310; employees, 583, and other persons, 1,217.

REMARKABLE SAFETY OF AMERICAN RAILWAY TRAVEL.

Having now presented the side of railway accidents which, from its nature, attracts and holds the chief attention in the public prints,

it is proper to put on record the reassuring side of the situation. For four years this Bureau has summarized the returns of American roads which have reported no fatalities to passengers in train accidents. The reports for the last three years are as follows:

**ROADS ON WHICH NO PASSENGER WAS KILLED IN A TRAIN ACCIDENT IN
THE YEARS 1908, 1907 AND 1906.**

	1908	1907	1906
Number of operating companies.....	316	300	279
Mileage of these companies.....	124,050	97,340	119,462
Passengers carried.....	455,365,447	313,846,272	398,484,008
Passengers carried 1 mile.....	14,776,368,000	10,256,862,000	12,414,934,000
Tons of freight carried.....	916,123,410	825,185,376	821,095,268
Tons of freight carried 1 mile.....	121,589,399,000	93,718,688,000	104,934,118,000
Passengers killed in train accidents.....	None	None	None
Passengers injured in train accidents....	2,695	2,107	2,533

The figures for 1908, considering the myriad units of risk involved, is a record for immunity from fatal accidents without parallel in the history of railway operation.

The miles of line represented is greater than that of the United Kingdom, Germany, France, Austria, Hungary, and Italy combined — in every mile, every rail, every tie, and every spike of which lurked the potentiality of a fatal accident.

The passengers' mileage exceeds by a thousand million the enormous passenger mileage of the United Kingdom.

The freight ton mileage exceeds that of all Europe, with that of Japan, Argentina, and Australia thrown in.

And yet this vast system, covering more than half the United States and operated under every condition of snow, blizzard, frost, flood, and tornado had not one passenger killed in a train accident.

And when the number of passenger injured in train accidents on these same roads, under identical conditions, is considered, relatively small though it is, the immunity from fatalities appears truly miraculous — albeit it proves the adventitious nature of all accidents.

Combining the returns for the past four years, it appears that during that time more than half the mileage of the United States is operated every year without a single fatality to a passenger. It is not always the same mileage — far from it — nor the best protected, because with protection is associated density of traffic — but it is an ever-present and reassuring certificate of the relative safety of the railways of the United States.

XIII—STATISTICS OF

In the next table is presented a comprehensive review of the mileage and other salient statistics of the principal divisions of Europe with several other countries from the latest information available.

The efforts to make this statement as comprehensive and accurate

Country	Year	Miles of Line	Capital or Cost of Construction	Receipts from Passenger Traffic	Receipts from Freight Traffic	Receipts from Other Sources	Total Receipts
United Kingdom	1907	23,108	\$6,282,099,773	\$205,036,740	\$298,058,610	\$88,848,280	\$591,943,630
German Empire	1907	34,980	3,752,450,445	172,339,893	418,021,052	68,413,909	658,774,554
Russia in Europe	1904	30,800	2,904,103,000	57,155,210	239,052,000	29,363,495	325,570,705
France	1906	24,896	3,356,920,000	139,376,970	167,956,770	5,856,750	313,190,490
Austria	1906	13,361	1,495,202,387	39,627,983	114,662,520	5,548,802	159,849,305
Hungary	1906	11,602	737,283,211	19,529,615	51,567,075	2,529,380	73,626,070
Italy	1906-7	10,704	1,091,608,000+	30,632,320	46,610,610	3,489,160	80,732,100
Spain	1905	8,432	649,919,610	16,215,866	34,694,555	6,190,271	57,100,692
Sweden	1905	7,763	248,129,140	9,900,188	18,848,976	610,772	29,359,936
Norway	1907	1,608	60,090,692	2,135,692	2,838,924	92,192	5,066,808
Denmark †	1906-7	1,164	57,051,304	4,870,900	4,964,516	702,696	10,428,112
Belgium	1906	2,854	480,406,890	17,433,654	37,816,420	1,068,220	56,329,294
Holland	1906	2,183	188,272,835	10,717,200	10,306,000	1,063,600	22,026,800
Switzerland	1906	2,675	282,451,833	15,667,003	19,168,760	1,580,320	36,416,083
Portugal	1905	1,425	162,385,280	4,014,196	5,322,875	423,936	9,761,007
Roumania	1906-7	1,975	173,139,174	4,856,845	9,351,210	528,820	14,736,875
Canada	1907	22,452	1,272,896,210	45,730,652	95,738,079	5,269,483	146,738,214
Argentina	1906	12,747	644,880,000	17,899,680	55,946,160	4,892,400	78,738,240
Japan	1907	4,807	215,686,821	19,183,604	16,582,975	3,568,878	39,335,457
British India	1907	29,303	1,232,441,240	49,172,800	88,310,080	3,692,480	141,175,360
New So. Wales	1908	3,472	222,475,210	7,693,626	14,821,358	1,562,296	24,077,280
Total		252,311	\$25,519,894,045	\$889,190,267	\$1,749,629,525	\$235,197,440	\$2,874,017,232
United States	1907	227,455	12,908,652,555	564,606,243	1,823,651,998	200,847,237	2,569,105,341

* Estimated.

† Capitalization Covers 8617 Miles of State Line only.

‡ State Road, only.

as possible have been so successful that in very few instances has it been necessary to resort to estimates, and in these cases, which are noted, the estimates are based on ascertained facts.

If British India, in which the conditions as to population and the cost of labor are abnormal, be eliminated from this table, it will be perceived that the mileage of the United States exceeds that of all the remaining countries. Including India, however, it can scarcely escape the most superficial observer that with only 10 per cent more

FOREIGN RAILWAYS

miles of line the total capitalization of these foreign railways is nearly double that of the railways of the United States.

This table furnishes data whereon rests the just boast of American railways that not only do they carry the greatest freight traffic in the world but they do it for the cheapest rates in the world.

Total Operating Expense	Ratio Expenses to Receipts	Passengers Carried	Mean Journey (Miles)	Tons of Freight Carried	Mean Haul (Miles)	Country
\$373,085,840	63.0	1,704,582,968	7.8	515,887,116	25.0	United Kingdom.
454,610,032	69.1	1,294,881,923	14.18	484,147,325	61.35	Germany.....
213,315,450	65.4	123,206,000	68.58	170,039,234	152.49	Russia in Europe
185,649,280	52.9	459,356,823	19.96	144,608,427	79.24	France.....
106,232,539	66.5	207,103,780	19.13	144,264,023	57.28	Austria.....
44,500,442	60.4	98,079,000	21.41	55,778,000	69.49	Hungary.....
63,042,950	78.1	63,000,000	25.00 *	29,751,614	66.00*	Italy.....
27,750,936	48.6	41,846,249	26.04	22,662,548	69.44	Spain.....
19,361,944	66.2	41,694,770	16.30	29,068,160	44.02	Sweden.....
3,479,712	98.7	10,356,425	15.37	4,360,685	34.10	Norway.....
8,361,332	80.2	20,511,669	20.66	4,695,301	52.42	Denmark.....
35,837,012	63.6	169,839,968	14.03	71,274,229	42.00 *	Belgium.....
18,410,000	83.6	41,886,000	18.35	15,773,300	56.85	Holland.....
23,655,431	65.0	91,013,634	12.63	15,513,356	43.06	Switzerland.....
4,426,236	45.3	13,446,043	20.00	3,775,559	54.00	Portugal.....
8,313,475	57.7	7,599,965	44.02	6,099,160	55.61	Roumania.....
103,748,672	70.7	32,137,319	64.00	63,866,135	183.00	Canada.....
46,798,560	59.4	34,193,565	43.00	27,036,728	114.70	Argentine.....
20,136,798	51.2	125,795,388	20.20	24,745,142	63.90	Japan.....
70,423,680	49.9	271,063,000	39.43	58,869,000	165.97	British India....
13,221,076	54.9	47,487,030	11.00	9,804,014	63.00	New So. Wales...
\$1,824,391,397	63.9	4,897,063,497	16.62	1,902,009,026	67.84	Total.....
1,748,515,814	67.53	873,905,133	31.72	1,796,336,659	131.71	United States....

Where the average receipts for all the countries in the above summary are 1.36 cents per ton per mile and that of Great Britain is 2.31, of Germany 1.41, of France 1.46, of Austria 1.39, the average for the United States is only $7\frac{1}{2}$ mills.

Outside of North America the only countries approaching the United States in cheap freight rates are Russia and India where the average haul is greater, and labor is so cheap that its pay is computed in copecks and pies, worth about a sixth of a cent apiece.

Further details of the railways of Canada, the United Kingdom and the German Empire are given in the succeeding pages:

RAILWAYS OF CANADA.

STATISTICS OF THE RAILWAYS OF THE DOMINION FOR THE YEARS
ENDING JUNE 30, 1907 AND 1908.

	1907	1908
Miles of line operated.....	22,608	23,311
Second track.....	1,096	1,211
Yard track and sidings.....	4,092	4,546
All tracks.....	27,796	29,06
Capital cost:		
Stock.....	\$588,563,591	\$607,425,349
Funded debt.....	583,369,217	631,869,664
Government railways.....	100,958,402	109,423,104
Subsidies.....	162,017,157	166,291,482
Total Capital cost.....	\$1,434,908,367	\$1,515,009,599
Per mile of line.....	63,910	65,968
Passenger traffic:		
Passengers carried.....	32,137,319	34,044,992
Passengers carried 1 mile.....	2,049,549,813	2,081,960,864
Average journey (miles).....	64	61
Average passengers per train.....	56	54
Mileage of passenger trains.....	30,220,461	31,950,349
Mileage of mixed trains.....	5,971,414	6,210,807
Receipts from passengers.....	\$39,184,437	\$39,992,503
Receipts per passenger mile (cents).....	1.911	1.920
Freight traffic:		
Tons carried.....	56,497,885	63,019,900
Tons carried 1 mile.....	11,687,711,830	12,961,512,519
Average haul (miles).....	183	206
Freight train mileage.....	38,923,890	40,476,370
Average tons per train.....	260	278
Receipts from freight.....	\$94,995,087	\$93,746,655
Receipts per ton mile (mills).....	8.12	7.23
Miscellaneous receipts.....	\$12,558,689	\$13,179,155
Total receipts.....	146,738,214	146,918,313
Expenses of operation:		
Way and structures.....	\$20,887,092	\$20,778,610
Maintenance of Equipment.....	21,666,373	20,273,626
Conducting transportation.....	57,325,543	62,486,270
General expenses.....	3,869,664	3,765,636
Total expenses.....	\$103,748,672	\$107,304,142
Ratio to earnings.....	70.72%	73.04%
Net receipts.....	42,989,552	39,614,171
Percentage to capital cost.....	3.00%	2.61%
Gross receipts per mile.....	\$6,535	\$6,389
Gross expenses per mile.....	4,621	4,672
Number of employees.....	124,012	106,404
Compensation.....	\$58,719,493	\$60,376,607
Proportion of gross earnings.....	40.02%	41.10%
Proportion of operating expenses.....	56.61%	56.27%
Average per employe per year.....	\$473	\$569

UNITED KINGDOM.

STATISTICS OF MILEAGE, CAPITALIZATION, AND TRAFFIC FOR THE
YEARS 1906 AND 1907.

	1906	1907
Length of railways:		
Double track or more (miles).....	12,811	12,845
Single track.....	10,252	10,263
Total length of line.....	23,063	23,108
Total capitalization.....	\$6,267,121,870	\$6,292,099,773
Capitalisation per mile of line.....	271,739	272,291
Passenger traffic:		
Passengers carried.....	1,240,347,000	1,259,481,000
Season ticket journeys.....	431,335,852	445,101,956
Passengers carried one mile.....	13,039,126,245	13,295,747,058
Average journey (miles).....	7.8	7.8
Receipts from passengers.....	\$200,668,350	\$205,036,740
Average receipts per passenger mile (cents)	1.54	1.54
Freight traffic:		
Minerals, tons carried.....	382,957,000	407,602,177
General merchandise.....	105,833,000	108,284,939
Total freight, tons.....	488,790,000	515,887,116
Tons carried one mile.....	12,219,750,000	12,897,177,900
Average haul (miles).....	25	25
Receipts from freight.....	\$284,379,836	\$298,058,810
Average receipts per ton mile (cents).....	2.33	2.31
Miscellaneous receipts.....	\$85,853,230	\$88,848,280
Total receipts.....	570,901,416	591,943,630
Expenses of operation.....	354,447,630	373,085,840
Ratio of expenses to earnings.....	62.1	63.0
Net receipts.....	\$216,453,786	\$218,857,790
Percentage to total paid-up capital.....	3.45	3.47
Gross receipts per mile.....	\$24,754	\$25,816
Gross expenses per mile.....	15,368	16,165
Number of employees.....	*581,664	621,341
Total compensation.....	\$152,698,850	\$158,116,560
Proportion of gross earnings.....	26.7	26.7
Proportion of operating expenses.....	43.1	42.4
Average per employee per year.....	\$262.52	\$254.47

* 1904 the last enumeration of employees preceding 1907.

GERMANY.

STATISTICS OF MILEAGE, COST OF CONSTRUCTION, AND TRAFFIC FOR THE
YEARS 1906 AND 1907.

	1906	1907
Length of state railways (miles).....	32,050	32,367
Length of private railways.....	2,513	2,613
Total.....	34,563	34,980
Cost of construction.....	\$3,613,493,706	\$3,767,220,777
Cost per mile.....	104,548	107,694
Passenger traffic:		
Passengers carried.....	1,209,224,072	1,294,881,923
Passengers carried (one mile).....	17,189,336,940	18,372,644,327
Average journey (miles).....	14.21	14.18
Receipts from passengers.....	\$170,165,002	\$172,339,593
Receipts per passenger per mile (cents)...	0.99	0.94
Freight traffic:		
Fast freight and express,		
Tons carried.....	3,791,769	3,935,538
Tons carried 1 mile.....	265,115,720	272,898,271
Average haul (miles).....	69.91	69.34
Receipts from same.....	\$16,924,080	\$17,295,969
Receipts per ton mile (cents).....	6.38	6.34
All freight:		
Tons carried.....	455,144,382	484,147,325
Tons carried, one mile.....	28,118,620,680	29,702,981,149
Average haul (miles).....	61.78	61.35
Receipts from freight.....	\$397,580,738	\$418,021,052
Receipts per ton mile (cents).....	1.41	1.41
Miscellaneous receipts.....	\$63,151,060	\$68,413,909
Total receipts.....	630,796,800	658,774,554
Expenses of operation.....	407,174,400	454,610,032
Ratio expenses to earnings.....	64.5	69.1
Net receipts.....	\$223,622,400	\$204,645,522
Percentage on cost of construction.....	6.18	5.42
Gross receipts per mile.....	\$18,251	\$18,833
Gross expenses per mile.....	11,780	12,996
Number of employees.....	648,437	695,557
Total compensation.....	\$219,390,932	\$245,389,859
Proportion of gross earnings.....	34.78	37.25
Proportion of operating expenses.....	53.88	53.98
Average per employee per year.....	\$338.35	\$352.82

XIV

RECOMMENDATIONS

In conclusion I would recommend:

RAILWAY STATISTICS.

That the Bureau of Railway Statistics and Accounts, now a division of the Interstate Commerce Commission, be placed under the jurisdiction of the Department of Commerce and Labor.

That its statistics be confined to the affairs of operating railway companies, the only companies engaged in Interstate Commerce.

That its inquiries be confined to data showing the facts essential to a clear and comprehensive presentation of railway conditions and operations in the United States from year to year.

That the railways be relieved from the burden of maintaining expensive accounting systems beyond the needs of their own administration and the requirements of full publicity.

ACCIDENTS.

That Congress provide for an official investigation of all railway accidents in the United States on lines patterned after the methods so successfully adopted in the United Kingdom. It should be a Bureau of the Department of Commerce and Labor, composed of:

One Chief Inspector.

Ten District Inspectors, one for each of the groups into which the country is divided, in railway statistics, appointed from U. S. A. engineer service with rank of Major.

Three Deputy Inspectors for each group.

Three Assistant Inspectors for each group.

Three Sub-Inspectors for each group.

Several groups might require four inspectors of each class and as many could get along with only two.

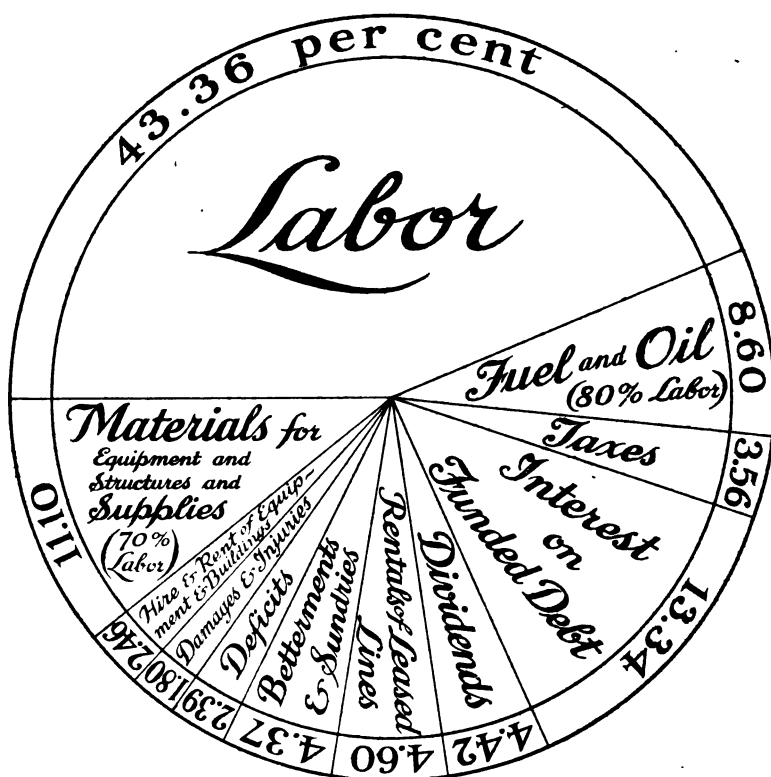
The various kinds of accidents should be apportioned among these inspectors according to their nature, as they are in Great Britain, and the inquiries should follow without delay as they do there.

Respectfully submitted,

SLASON THOMPSON.



How the Gross Earnings of American Railways



Were Distributed in 1906

TRANSPORTATION LIBRARY

RAILWAY STATISTICS
OF THE
UNITED STATES OF AMERICA

FOR THE YEAR ENDING JUNE 30

1909

COMPARED WITH

THE OFFICIAL REPORTS OF 1908
AND
RECENT STATISTICS OF FOREIGN RAILWAYS

PREPARED BY

SLASON THOMPSON
BUREAU OF RAILWAY NEWS AND STATISTICS

CHICAGO:
THE GOWDROST-WALKER PRINTING COMPANY
1910



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INTRODUCTION

TO THE

STATISTICS OF AMERICAN RAILWAYS FOR 1909

"The function of accounts is to record facts. True accounting is nothing more, nor nothing less, than the correct statement of what in fact has taken place, and the measurement of that fact in an appropriate figure."—Prof. Henry C. Adams.

To be of the highest value, statistics must be accurate, uniform and continuous.

In the United States the government statistics of railways have the appearance of being gathered, compiled and disseminated to discredit and harass the great industry the government is pledged to foster as well as regulate. In no other civilized country on earth is the function of statistics so abused.

Nothing in the nature of statistics under official authority more confusing and misleading has ever been issued from the government printing office than those portions of the Twenty-third Annual Report of the Interstate Commerce Commission for the year ending June 30, 1909, purporting to deal with the financial results of the railways of the United States for the fiscal years 1908 and 1909.

On the first page of the Report the financial results of the last two fiscal years are set down thus:

	Operating Revenues	Operating Expenses	Taxes	Operating Income
1908.....	\$2,461,521,345	\$1,721,327,155	\$83,775,869	\$655,418,321
1909.....	2,494,115,589	1,662,102,172	89,026,226	742,987,191

The mileage operated in 1908 is stated as 228,164.80 and in 1909 as 233,002.67 miles.

On page 54 of the report the summary compiled from the monthly reports gives the following comparative figures for the same years:

	Total Operating Revenues	Total Operating Expenses	Net Revenue	Taxes
1908.....	\$2,421,542,004	\$1,687,144,975	\$734,397,029	\$83,775,869
1909.....	2,443,312,232	1,615,497,233	827,814,998	89,026,226

The mileage is the same as above, with the added information that the mileage operated at the end of the fiscal year 1908 was 229,952.36; and at the end of 1909, 234,182.70.

It will be observed that the taxes in both summaries are identical, but in one they are subtracted from net revenues and in the other they are not.

An insert facing page 54, giving the details of the monthly reports from which the table on that page is compiled, reveals the common source of both sets of returns and gives the key to the discrepancy between them. This is no less than the inclusion in the former of the revenues and expenses from "outside operations," which are excluded from the summary on page 54, in which the "net revenue" only from such outside source is mentioned and added to the net revenue from rail operations.

The impropriety and inaccuracy of such accounting becomes manifest when its effect is seen to vary the ratio of operating expenses to earnings from 69.67% to 69.93% in 1908, and from 66.12% to 66.64% in 1909.

On pages 64 and 65 appears another set of income figures for the year ending June 30, 1908. This is compiled from the annual reports of the carriers operating 230,494 miles of line, from which *the mileage of switching and terminal companies is excluded*. It supplies the following summary:

YEAR ENDING JUNE 30, 1908.

Rail operations:	
Operating revenues	\$2,393,805,989
Operating expenses	1,669,547,876
Net operating revenue	724,258,113
Taxes	78,673,794
Net revenue from outside operations	5,977,268
Operating income	651,561,587
Ratio of operating expenses to earnings	69.72

As these figures are compiled from the only returns which furnish data respecting all the various phases of railway operation in the United States, they will be accepted in subsequent pages as the official returns for 1908.

The above figures are exclusive of returns from switching and terminal companies, whose earnings, according to the monthly reports in 1908, were \$23,028,773; expenses, \$16,383,481, and taxes, \$1,245,261.

GROSSLY EXAGGERATED DIVIDENDS.

But these are venial variations compared to the deliberate misrepresentation as to dividends on page 62 of the report, where it is stated:

"The amount of dividends declared during the year was \$386,879,362, being equivalent to 7.99 per cent on dividend-paying stock. For the year ending June 30, 1907, the amount of dividends declared was \$308,088,627."

This statement is the more reprehensible because the inaccuracy of the reference to dividends in 1907 was exposed a year ago, and \$115,550,909 of the 1908 total is proved to be fictitious by the line in the condensed income statement of the report (page 65) reading: "Dividends declared from current income, \$271,388,453." It takes dividends from surplus, dividends by leased companies, and dividends from surplus of leased companies to make up that gross deception as to the dividends declared in 1908. And all these "several dividends" are only made statistically possible by including in current income \$274,450,192 "other income" NOT derived from transportation.

It is impossible to overestimate the harmful popular effect of exaggerating the dividends paid by the railways by \$80,693,665 in 1907 and \$115,550,909 in 1908. The public mind does not stop to distinguish between dividends "declared," dividends paid out of "income" and net dividends actually paid out of net earnings of railway traffic.

This whole statistical structure of fictitious dividends has been built up in successive reports upon the false premise of including intercorporate payments on both sides of the income account. What the public is entitled to know is the disposition of the gross sum paid by it for transportation services—those services which the Act to Regulate Commerce was passed to regulate.

BEWILDERING CHANGES IN NOMENCLATURE.

Scattered through the official reports for 1908 the student is confronted with numerous changes in terminology, many of which are for the better, but nearly all impair that continuity of names and phrases which is so desirable in comparative statistics. For instance, the public has been taught, by official practice, to speak of the revenues of the railways derived from the transportation of passengers, freight, mail and express, as "Gross earnings from operation." The phrase is descriptive, definite and clear. For this the Commission has substituted "Rail operations, operating revenues." Former reports spoke of "Income from operation," which now gives place to "Net operating revenue." To this is added the "net revenue from outside operations," making a "Total

net revenue," from which "Taxes accrued" are deducted, the remainder being "Operating income."

It will be perceived that this last phrase, which covers revenues from which operating expenses and taxes have been deducted and to which the net revenues from outside operations (sometimes they involve a deficit) have been added, comes perilously near the "Income from operation" of preceding reports.

The exclusion of the reports from switching and terminal companies in some instances, while they are included in others, introduces an element of perplexing uncertainty at every turn and really vitiates all comparisons with former reports.

The Commission itself seems to realize the bog into which the official statistician has plunged its accounts, when it says:

"The changes in the income account submitted in the report under consideration *are so far reaching in their results*, in a number of instances, as to impair direct or close comparison with figures for similar items in previous statistical reports."

And now it is proposed to throw all the accumulated statistics of twenty-two years out of consecutive gear by substituting the calendar for the fiscal year.

The writer has deemed the foregoing comments necessary to clear the atmosphere before proceeding to the introductory summary showing the salient features of the railway industry in 1909 compared with similar items in 1899 and 1889. The data for 1909 is compiled from the annual reports to this Bureau covering 221,132 miles of operated line, together with the monthly reports to the Commission of earnings and expenses of all classes of roads for that year, covering an average operated mileage of 233,002.

**SUMMARY OF RAILWAY RESULTS IN 1909, 1899 AND 1889, WITH
PERCENTAGES OF INCREASE FOR EACH ITEM BY DECADES.**

(m = 1,000.)

Item	1889	1899	1909	In- crease over 1889 %	In- crease over 1899 %
Miles of line.....	153,385	187,534	234,182	52.7	24.9
Miles of all track.....	195,958	250,784	340,000	73.5	35.5
Net capitalization (m).....	\$7,366,745	\$9,432,041	\$13,508,711	83.3	43.2
Net capitalization per mile of line..	48,021	51,764	57,962	20.7	11.9
Net capitalization per mile of track	37,593	38,527	39,730	5.6	3.1
Gross earnings from operation (m)	964,816	1,313,610	2,443,312	153.2	86.0
Gross earnings per mile of line...	6,290	7,005	10,486	66.7	49.7
Expenses of operation (m).....	644,706	856,968	1,615,497	150.5	88.4
Expenses of operation per mile of line.....	4,204	4,570	6,933	64.9	51.7
Net earnings from operation (m)...	320,101	456,642	827,814	157.9	81.2
Net earnings per mile of line.....	2,086	2,435	3,552	70.2	45.8
Ratio of expenses to earnings.....	66.81	65.24	66.12	d 2.3	1.0
Receipts from passengers (m)....	\$254,041	\$291,113	\$564,302	122.1	93.8
Receipts from freight (m).....	642,662	913,737	1,682,919	161.8	84.1
Receipts from mail (m).....	21,901	35,999	50,935	132.6	41.5
Receipts from express (m).....	19,778	26,756	63,669	221.9	137.9
Passengers carried (m).....	472,171	523,176	880,764	86.5	68.3
Passengers carried one mile (m)...	11,553,820	14,591,327	29,452,000	154.8	101.8
Receipts per passenger per mile (cents).....	2.165	1.978	1.916	d 11.5	d 3.1
Freight tons carried (m).....	539,639	959,763	1,486,000	175.3	54.8
Freight tons carried one mile (m)...	68,727,223	123,667,257	222,900,000	224.3	80.2
Receipts per ton per mile (mills)...	9.22	7.24	7.55	d 17.0	4.2
Locomotives, number.....	29,036	36,703	57,220	97.0	55.9
Locomotives, weight (tons).....	1,161,440	1,945,259	4,158,000	258.0	113.7
Passenger cars (number).....	24,586	33,850	46,026	87.2	35.9
Freight cars, number.....	829,885	1,295,510	2,113,450	154.6	63.1
Freight cars, capacity (tons).....	16,597,700	34,978,770	73,126,370	340.5	109.0
Average tons in train.....	179	243	388	116.9	59.6
Employees, number.....	704,743	928,924	1,524,000	116.2	64.0
Employees, compensation.....	\$389,785,664	\$522,967,896	\$1,003,270,000	157.4	91.8
Proportion of gross earnings.....	40.40	39.80	41.00	1.4	3.0
Proportion of operating expenses..	60.46	61.02	62.10	2.7	1.7
Taxes.....	\$27,590,394	\$46,337,632	\$91,280,000	230.8	96.9
Per mile of line.....	180	247	390	116.6	57.9
Proportion of gross earnings.....	2.86	3.53	3.73	30.4	5.6

There is not a line or figure of this table, with its percentages of increase, that does not testify at once to the amazing growth of American railways and to the equally amazing economical basis upon which they render incalculable services to the American people on terms that challenge the admiration of less favored peoples.

REVIEW OF THE LAST THREE CALENDAR YEARS.

Where the Twenty-second Annual Report of the Interstate Commerce Commission minimized the loss inflicted on the railways by the business depression of 1908, the Twenty-third Annual Report naturally, and by reason of the same cause, minimizes the substantial recovery of 1909. Where the former showed a loss in gross earnings of only \$164,464,941 below the preceding year, when the actual result of the depression was nearly \$300,000,000 (\$298,457,576), the latter shows a recovery of only \$21,770,228, when it was approximately \$282,000,000 (\$281,934,932).

The explanation of this discrepancy is, of course, the Commission's adherence to its own fiscal periods of statistics, which do not happen, in this instance, to coincide with the ebb and flow of adversity and prosperity. The true movement of railway traffic before, during and after the recent business depression is more nearly reflected in the following figures for the calendar years 1907, 1908 and 1909, compiled from the monthly returns to the Interstate Commerce Commission, divided into periods of six months:

SUMMARY OF GROSS EARNINGS OF THE RAILWAYS DURING THE CALENDAR YEARS 1907, 1908 AND 1909, BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907	1908	1909
January.....	\$199,000,000	\$173,611,809	\$183,139,419
February.....	178,300,000	161,085,493	174,425,832
March.....	211,700,000	183,509,935	205,700,012
April.....	214,800,000	175,071,604	196,993,104
May.....	224,800,000	174,527,138	201,572,072
June.....	223,000,000	184,047,216	210,356,965
Half year.....	\$1,251,600,000	\$1,051,853,195	\$1,172,185,404
July.....	\$228,672,250	\$195,245,655	\$219,964,739
August.....	241,303,469	206,877,014	236,559,877
September.....	234,386,899	219,013,703	246,065,955
October.....	250,575,757	233,105,042	260,613,053
November.....	220,445,465	211,281,504	247,370,954
December.....	194,304,969	205,455,170	222,006,183
Half year.....	\$1,369,688,809	\$1,270,978,038	\$1,432,580,761
Total.....	2,621,288,809	2,322,831,233	2,604,766,165
Average mileage.....	227,000	231,584	234,950
Earnings per mile.....	\$11,548	\$10,030	\$11,086

**SUMMARY OF OPERATING EXPENSES OF THE RAILWAYS DURING THE
CALENDAR YEARS 1907, 1908 AND 1909, BY MONTHS
AND HALF-YEARLY PERIODS, WITH RATIOS
TO GROSS EARNINGS.**

	1907	1908	1909
January.....	\$134,225,000	\$132,502,830	\$132,659,037
February.....	121,500,000	123,773,906	125,229,071
March.....	142,425,000	128,200,065	136,086,299
April.....	144,990,000	124,284,164	134,612,576
May.....	151,740,000	123,932,568	135,846,301
June.....	150,525,000	124,208,561	136,160,775
Half year.....	\$845,405,000	\$756,902,094	\$800,594,059
Ratio.....	67.7%	72%	68.3%
July.....	\$152,992,445	\$127,978,304	\$141,613,967
August.....	156,837,914	131,557,475	146,175,338
September.....	156,631,780	137,155,143	150,621,999
October.....	166,999,266	144,195,330	156,628,513
November.....	154,150,468	136,909,421	153,043,599
December.....	142,631,008	136,867,622	153,699,578
Half year.....	\$930,242,881	\$814,563,295	\$901,782,994
Ratio.....	68%	64.1%	62.9%
Total.....	\$1,775,647,881	\$1,571,465,389	\$1,702,377,053
Ratio.....	67.8%	67.7%	65.4%
Net operating revenue.....	\$845,640,928	\$751,365,844	\$902,389,113
Taxes.....	83,156,188	86,872,885	92,964,510
Net operating income.....	\$762,484,740	\$664,492,959	\$809,424,603

Through these tables the reader is able to trace the upward course of railway receipts in 1907 to their culmination in October of that year; their rapid drop to February, 1908; through the hard summer following to the gradual recovery of 1909, until in October last they reached the highest monthly total on record.

Concurrently with this story of the depression of 1908, the tale of railway distress and of the drastic measures adopted to meet the emergency can be read in the half-yearly ratios. The ratio for the fiscal year 1906-'07 was 67.53%, and the shadow of approaching trouble was shown in an increase of this ratio to 67.7% for the first six months in the table. By December this ratio had risen to 73.40%. The enormous receipts of the autumn months held the ratio for the six months down to 68%. In February, 1908, it marked the high and ruinous figure of 76.84, and from that point the trend, due to severe retrenchments, was steadily downward until it touched 60.10% in October, 1909.

The ratio of 64.1% for the second half of 1908 is the true measure of the ability of the railways to cut their expenditures to fit the times. But they were on bed rock, as the succeeding months of small receipts proved, when the ratio went up to 72.43% in January, and averaged the high figure of 68.3% for the first six months of 1909. The heavy receipts of October and November without a corresponding expansion of expenditures resulted in the phenomenally low ratios of these months. But the severity and necessities of operating conditions in December, 1909, ran the ratio of expenses up to 69.23%.

The net earnings for the three years under consideration are apt to lead to erroneous conclusions as to the effect of the depression. Neither the loss in 1908 nor the recovery in 1909 reflects the true swing of the pendulum. The one minimizes the loss, because it conceals the cessation of all constructive work, the curtailment of betterments and improvements, and the postponement of all purchases for replacements except of the most immediate and imperative nature; the other exaggerates the recovery because of heavy receipts without the resumption of the concurrent expenditures that should attend them. The railways in the fall of 1909 were simply doing business on the margin of facilities provided during the fat months of 1907 in anticipation of a continuation of prosperous times. Some idea of the extent of this margin may be gained from the parking of 400,000 freight cars in the yards with 200,000 in the shops in April, 1908. At no time since has this margin been wholly exhausted.

But a continuation of traffic on the scale of the past six months will necessitate an immediate expenditure of \$100,000,000 to \$150,000,000 for the replacement of freight cars alone.

INCOME ACCOUNT FOR THE CALENDAR YEAR 1909.

The monthly summaries issued by the Interstate Commerce Commission from time to time afford the details for the construction of the following statement of the transportation revenues and expenses of the railways for the calendar year 1909, from which the averages per mile and the ratios have been computed on the basis of 234,950 miles of operated line.

**STATEMENT OF OPERATING RECEIPTS AND EXPENSES OF THE RAIL-
WAYS OF THE UNITED STATES FOR THE CALENDAR YEAR
ENDING DECEMBER 31, 1909, WITH AMOUNTS PER
MILE AND RATIOS.**

(Average miles of line operated, 234,950.)*

	Amount	Per Mile	Ratio to Gross Earnings
Receipts from:			
Freight	\$1,796,256,314	\$ 7,645	68.96
Passengers	601,722,959	2,561	23.10
Other transportation revenues	182,706,090	777	7.01
Non-transportation sources	24,080,802	103	.93
Total revenues	\$2,604,766,165	\$11,086	100.00
Expenses:			
Maintenance of way and structures	\$ 339,167,666	\$ 1,448	13.06
Maintenance of equipment	387,155,080	1,644	14.83
Traffic expenses	53,257,408	223	2.01
Transportation	857,339,037	3,650	32.92
General expenses	65,441,053	280	2.52
Unclassified	16,809	.....	.....
Total expenses	\$1,702,377,052	\$ 7,245	65.35
Net operating revenues	902,389,112	3,841	34.65
Profit from outside operations	3,367,713	14	.....
Net revenues	\$ 905,756,825	.....	.....
Taxes	92,964,510	395	3.56
Net income	\$ 812,792,315	\$ 3,460	

*At the close of the year the reports covered 236,166 miles of operated line.

Unfortunately there are no similar figures for the calendar year 1907 with which comparisons may be made, but the official returns for the year ending June 30, 1907, when railway earnings reached their maximum before the panic of that year, afford the following instructive comparisons:

	Year to June 30, 1907	Year to Dec. 31, 1909
Gross earnings	\$2,589,105,578	\$2,604,766,165
Per mile	11,383	11,086
Operating expenses	1,748,515,814	1,702,377,053
Per mile	7,687	7,245
Ratio	67.53	65.35
Net revenues	840,589,764	902,389,112
Per mile	3,696	3,841
Taxes	80,108,006	92,964,510
Per mile	367	395

It will be perceived that while the earnings in 1909 exceeded those of 1907 by over 15½ millions they were almost \$300 less per mile, while the operating expenses were actually \$442 less per mile. The decreased operating ratio in 1909 bears unmistakeable testimony as to where the increase in net revenues came from.

With an increase of nearly 9,000 miles of line only \$339,167,665 was spent on maintenance of way and structures in 1909 against \$343,544,907 in 1907, and the urgent demands of returning activity made the expenditures on this account liberal in comparison with those for the year ending June 30, 1909, i. e. \$311,368,083, or \$1,336 per mile. It will be years before the railways recover from the economies forced on them by the loss of \$300,000,000 in revenues in 1908.

UNREGULATED REGULATION OF AMERICAN RAILWAYS.

Today the railways of the United States are "cribb'd, cabin'd and confined" in their services to the American people, not so much by the laws for their regulation as by the spirit in which those laws are administered. To the general tenor and purposes of statutory regulation the railways have become largely reconciled; but from the spirit in which the laws are sought to be enforced, there has to be continuous appeal to the courts and to the public sense of justice.

Regulation of railways has been persistently interpreted by political Commissions to spell reduction of rates and exacting conditions that would drain the purse of Fortunatus. Between 1889, when the Interstate Commerce Commission's statistics first became a valuable index of railway operation, and 1909, the average rate per ton mile has fallen from 9.22 to 7.55 mills. On the freight tonnage of 1909 this meant a reduction of over \$372,000,000 in the yearly revenues of the railways. The railways suffered that loss from their income when they needed every cent of it to maintain the people's highway in a condition to transport the people's ever-growing traffic.

The railways lost it, but who got it? The people? Search the market reports of the land, from Eastport to San Diego, and you will find incontestable proof that not one cent of these millions reached the pockets of the people, in whose name all regulation of railways is demanded and for whose benefit all reductions are claimed. The average rate on all commodities has gone down, the price of every commodity transported by the railways has gone up. Who has pocketed the difference?

There can be only one answer—the producers, the shippers and the traders. Today nine-tenths of the increased cost of living in the United States is chargeable to this ever vigilant and aggressive coalition. For everything the railways must buy—labor, supplies, money—they have to pay the advanced prices of the day. But the protests of the shippers and the rulings of the Commission forbid their raising a rate or adopting a money-saving economy. They attempted to readjust freight rates in 1900 one-fiftieth of a cent per ton mile above a ruinously low average and the outraged shippers secured the passage of the Hepburn Act!

How the federal Commission and shippers work together for the so-called regulation of the railways is evidenced in the unbroken tenor of the decisions handed down by the Commission. Out of 357 decisions printed during the year 1908-09, no less than 219, or 61.3%, were orders granting reductions of rates or reparation for charges found comparatively excessive or unreasonable. In not one case in a score was the rate found excessive or unreasonable *per se*. In only one case out of the 357 was an increased rate ordered, and this was done reluctantly and as unavoidable.

Although the decisions are for the most part the unanimous finding of the Commission, the following table distributes the opinions of the year among its members into dismissals and reductions or reparations among the Commissioners writing them:

Opinion by	Dismissing Complaints	Granting Reductions or Reparation
Chairman Knapp.....	21	20
Commissioner Clement.....	16	29
“ Prouty.....	13	40
“ Cockerill.....	20	20
“ Lane.....	20	42
“ Clark.....	29	28
“ Harlan.....	19	40
Total.....	138	219
Per cent.....	39.7	61.3

Some of the cases upon which the Commission is called on to pass are so trivial as to be beneath the notice of a justice's court, while others involve issues so momentous as to threaten the whole structure of railway rates by which the unparalleled prosperity of the country has been made possible.

But the number of cases reaching the Commission for adjudication is insignificant compared with the grist of informal reparation

orders that runs an endless stream through its regulating rollers. In the twelve months from December 1, 1908, to November 30, 1909, these aggregated no less than 2,223 separate orders involving amounts all the way from 47 cents to \$14,717.64, as seen in the following orders:

7100. *Larabee Flour Mills Company v. Atchison, Topeka & Santa Fe Railway Company.* September 11, 1909. Refund of \$0.47 on shipment of cotton bags from Kansas City, Mo., to Hutchinson, Kas., on account of excessive rate.

3629. *Lackawanna Steel Company v. Central Railroad Company of New Jersey.* June 26, 1909. Refund of \$14,717.64 on shipments of spiegeleisen from Newark, N. J., and Hazard, Pa., to Buffalo, N. Y., on account of excessive rates.

Multiplying these awards by the number of orders enables the reader to imagine the range of their respective pettiness or portentous possibilities.

It is doubtful if the American people, or even the Interstate Commerce Commissioners themselves, realize how the formal decisions and informal orders of the Commission are slowly but surely whittling away the safe margin of American railway profits. At the rate of two decisions every three days and forty informal orders per week, the work of incipient confiscation proceeds with remorseless enthusiasm.

With the best intentions in the world the present Interstate Commerce Commission is so enmeshed in its own anti-railway traditions, so enamored of the administrative control theories of its statistician, so covetous of unbridled, irresponsible authority to tear down where it has no constructive capacity, that anything like co-operation between the Commission and the railway management for the public good seems out of the question.

To the writer it appears that only blind rejection of facts can find any conserving element in the regulation of railways as at present administered. Signs of a helpful disposition in official acts are entirely lacking. The Senate and House calendars groan under bills for the further regulation and restriction of the railways, but not one contains a promise of relief. For not one is there a genuine public demand.

And what is the situation as this is written? It can be stated in a few lines. As a consequence of the drop of \$300,000,000 in gross earnings in 1908, the railways in 1908 and 1909 cut \$277,000,000 out of their expenditures. This was done mainly at the expense of maintenance of way and structures and in a cessation in the purchase of equipment, but the so-called economies of postponed

expenditures permeated every line of railway extension, operation and replacement. In 1908, with 6,000 more miles of track to maintain, \$18,788,217 less was spent for maintenance than in 1907, and in 1909 with 12,000 more miles of track \$32,176,824 less was expended.

Between 1897 and 1907 the expenditures for maintenance of way increased from \$159,434,403 to \$343,544,907, or over 115%. This means an increase of approximately 8% a year, or at least \$25,000,000 on present plant. Therefore at least \$43,000,000 was withheld from this essential line of railway maintenance in 1908 and fully \$82,000,000 in 1909, a total of \$125,000,000. The saving on equipment was nearly as great and is dealt with in the body of the report.

A comparison of the income accounts for the month of October, 1907 and 1908, corroborates the foregoing statement as to the economies forced on the railways by the adverse winds of regulation and business depression.

Month of October	1907	1909
Earnings from operation.....	\$250,575,757	\$260,613,053
Operating expenses.....	166,999,266	156,628,513
Net earnings.....	\$ 83,576,491	\$113,984,540
Operating ratio.....	66.64	60.10

The canker worm in this, the most promising flower of returning prosperity, is revealed in the abnormal ratio of 60.10 for October, 1909, or nearly 7% below the American average. Now this 7% on the revenues of last October means that in some way over \$16,000,000 less than normal was expended on American railways in that month alone. And October, 1909, was only a sample of how railways had cut expenses for 24 consecutive months.

That this should be so, with no reduction in the scale of wages or the price of supplies, is, in the view of the writer, a situation of serious national concern. Happily he is not charged with any commission to suggest how or where the deferred debt of nearly \$300,000,000 to efficient railway road and equipment is to be met. But that it must be met, to place the railways in as good condition as they were before the panic of 1907, when the cry was for more, not less facilities, does not admit of question. If it, together with the advance in wages now being adjusted, is to be met out of income, only an advance in freight rates can take care of it. If out of fresh capital, it can only be coaxed from the pockets of shrewd investors

by rates of interest that discount the risk attendant on the unregulated and irresponsible regulation of railway revenues, resources and responsibilities. And it is proposed to make an irresponsible Commission, unfamiliar with the necessities of the situation and unversed in the ways and means of raising capital arbiters of these necessities, ways and means.

All attempts to meet such a situation by legislation, unless it be directed to a reform of the instrumentalities of regulation, must prove ineffectual. In a broader, saner, more helpful administration of the laws already on the federal and state statute books lies the hope for the future of the great American transportation industry. "Whate'er is best administered is best."

THE BUREAU'S STATISTICS FOR 1909.

Thus far what has been written has related almost wholly to the financial aspect of the transportation industry as presented through the monthly reports of the railways. While these in their way serve as an admirable barometer in keeping the public informed as to general business conditions throughout the Union, they throw little light upon the railway operations behind the financial results. They are absolutely dumb on the main question upon which all railway legislation and regulation should hinge—adequate and efficient public service.

In the following pages the Bureau attempts to remedy this omission, in the essential particulars for the year ending June 30, 1909. The reports from which its summaries have been compiled were received almost a month earlier this year than last, but the publication of the Bureau's statistics has been delayed in order to make the usual comparisons with the Official Statistics for 1908. The writer is advised from Washington that the fault for this unusual delay rests with the Government printer—whose office is overwhelmed with Congressional and departmental work—and not with the Interstate Commerce Commission or its Bureau of Statistics and Accounts.

For the first time, the reports to this Bureau cover the division of freight movement into the seven chief commodities; the separation of revenues from Mail and Express; the distribution of expenses for injuries and damages, and the summaries of expenses for maintenance of way and equipment, traffic expenses, transportation expenses and general expenses. It is believed that with the addition of these accounts the annual report of the Bureau has become so compre-

hensive as to warrant its publication hereafter at an earlier date, without waiting on the publication of the official statistics for the preceding year.

This year the Bureau has received reports from 368 roads operating 221,132 miles of line or approximately 94.4% of the mileage and carrying over 97% of the traffic of the country. Last year reports were received covering 216,460 miles. The increase of 4,672 miles fairly represents the actual increase of railway mileage in the United States for the twelve months.

In presenting these statistics, the writer has endeavored to make them as colorless summaries of facts as an earnest desire to arrive at the truth permits. Such comment as accompanies them will be confined to comparisons and elucidation and not to the furtherance of any personal theories.

For the sake of brevity, the Interstate Commerce Commission will be referred to herein as the "Commission"; the Commission's "Statistics of Railways in the United States" as "Official Statistics" and "the year ending June 30th" will be implied before the year named unless otherwise specified.

The statements as to foreign railways are compiled from the latest official sources available.

Here the writer wishes to record his personal appreciation of the assistance rendered by the executives and accounting officials of the railways, whose co-operation has made this report possible. In the midst of increasing burdens imposed on them in reporting to federal and state commissions and legislatures, the requests for information from this Bureau might have seemed excusably negligible. The completeness of the report itself testifies to the cordiality with which the Bureau's work is viewed.

Acknowledgments are also due to Federal and State officials for their uniform courtesy in responding to the many requests from this Bureau, and the writer has been much gratified to receive from the chief government railway official of one foreign country the assurance that he considers its Annual Report "one of the most comprehensive and useful compilations of statistical matter relating to railways that has come into his hands."

SLASON THOMPSON.

CHICAGO, April 30, 1910.

I

MILEAGE IN 1909

According to the preliminary income report of the Interstate Commerce Commission for the year ending June 30, 1909, compiled from the monthly returns, the average railway mileage operated in the United States during the year was 233,002.67 miles; and the total mileage operated at the end of the year was 234,182.70.

The former total is made up of:	
Large roads operating 251 miles or more.....	214,916.86 miles
Small roads " 250 " or less.....	16,801.52 "
Switching or terminal companies.....	1,284.29 "
Total.....	233,002.67 miles

The returns to this Bureau, compiled from the annual reports for the same year, cover 221,132 miles, against 216,460 in 1908, an increase of 4,672 miles. Reports to the Commission for December, 1909, showed a total operated mileage of 236,166 miles.

In its report dated December 21, 1909, the Commission stated that for the year ending June 30, 1908, substantially complete returns had been received for 230,494 miles of line operated, including 8,661.34 miles used under trackage rights. These are the official figures of mileage for 1908, which will be used in all subsequent comparisons with the Bureau's figures for 1909—the latter, however, may include some switching and terminal mileage excluded from the former.

Of the mileage reporting to this Bureau, 8,927 miles were operated under trackage rights, leaving a net of 212,205 miles of line covered by capitalization and rental.

Assuming that the total operated mileage in the United States at the close of the fiscal year 1909 was 234,182, the complete returns to this Bureau cover approximately 94.4% of the mileage and 97% of the traffic of all the railways in the United States. No attempt has been made, or will be made, to segregate the returns of switching and terminal companies from the Bureau's figures, of which they are an integral part.

The first summary under this table presents the *operated* mileage reported to this Bureau in 1909 and 1908, classified by states and territories in comparison with the official figures of mileage owned in 1908, with relation to area and population of the respective territorial divisions:

STATEMENT OF RAILWAY MILEAGE IN THE UNITED STATES, DISTRICTS
AND TERRITORIES IN 1909, 1908 AND 1907, AND IN RELATION
TO AREA AND POPULATION

	Bureau Figures		1907 Official Mile	Mileage per 100 Sq. Miles of Territory	Inhabit- ants per Sq. Mile
	1909 operated Miles	1908 operated Miles			
Alabama.....	4,077	4,744	4,841	6.77	478
Alaska.....	5,096	5,758	4,855	6.22	80
Arizona.....	6,576	6,275	5,884	4.89	245
Arkansas.....	7,226	7,046	5,247	6.00	71
California.....	931	936	1,011	26.00	606
Colorado.....	242	247	336	17.14	615
Connecticut.....	5,117	5,046	5,071	7.30	145
Delaware.....	6,487	6,245	6,725	11.85	385
District of Columbia.....	1,651	1,588	1,751	2.08	106
Florida.....	12,216	12,796	12,157	21.81	401
Georgia.....	7,774	7,826	7,286	26.24	388
Iowa.....	4,023	4,465	4,467	17.87	255
Kansas.....	4,275	4,775	4,686	16.04	181
Kentucky.....	5,229	5,205	5,051	8.71	606
Louisiana.....	5,860	5,805	4,888	16.45	536
Maine.....	1,984	1,750	2,065	7.16	861
Maryland.....	1,825	1,278	1,482	14.06	606
Massachusetts.....	2,779	2,779	2,112	26.45	7466
Michigan.....	5,384	5,512	5,061	15.65	305
Minnesota.....	5,255	5,100	5,246	16.46	286
Mississippi.....	5,545	5,281	4,781	6.00	416
Missouri.....	5,200	5,141	5,089	11.76	426
Montana.....	5,537	5,438	5,877	2.08	91
Nebraska.....	6,089	6,085	5,682	7.76	200
Nevada.....	1,621	1,540	1,700	3.55	98
New Hampshire.....	1,211	1,211	1,248	15.86	350
New Jersey.....	2,046	2,046	2,250	30.50	977
New York.....	8,106	7,989	8,472	17.86	937
North Carolina.....	3,567	3,332	4,385	9.21	473
North Dakota.....	4,026	4,025	3,968	5.36	118
Ohio.....	8,951	9,041	9,261	22.73	309
Oklahoma.....	5,572	5,332	5,488	7.84	209
Oregon.....	1,687	1,600	1,939	2.07	937
Pennsylvania.....	10,532	10,224	11,239	23.93	621
Rhode Island.....	192	190	208	20.11	2,909
South Carolina.....	2,892	2,975	3,271	11.02	431
South Dakota.....	3,646	3,568	3,703	4.82	129
Tennessee.....	3,283	3,528	3,725	10.01	600
Texas.....	12,847	12,932	12,932	4.03	203
Utah.....	1,820	1,772	1,957	2.12	156
Vermont.....	941	920	1,071	11.08	331
Virginia.....	4,099	3,900	4,050	10.43	403
Washington.....	3,353	3,207	3,707	6.00	152
West Virginia.....	2,846	2,777	3,264	13.02	320
Wisconsin.....	7,039	6,900	7,159	14.01	301
Wyoming.....	1,420	1,414	1,520	1.50	70
Arizona.....	1,705	1,684	1,028	1.71	71
New Mexico.....	2,782	2,521	2,905	2.12	74
District of Columbia.....	51	42	31	53.53	9,700
Canada†.....	1,343	1,273	.....	.....	.....
United States.....	221,132	216,460	227,071	7.74	870

*Official mileage by States not available for 1908.

†Mileage operated in Canada by American roads.

I

MILEAGE IN 1909

According to the preliminary income report of the Interstate Commerce Commission for the year ending June 30, 1909, compiled from the monthly returns, the average railway mileage operated in the United States during the year was 233,002.67 miles; and the total mileage operated at the end of the year was 234,182.70.

The former total is made up of:	
Large roads operating 251 miles or more.....	214,916.86 miles
Small roads " 250 " or less.....	16,801.52 "
Switching or terminal companies.....	1,284.29 "
Total.....	233,002.67 miles

The returns to this Bureau, compiled from the annual reports for the same year, cover 221,132 miles, against 216,460 in 1908, an increase of 4,672 miles. Reports to the Commission for December, 1909, showed a total operated mileage of 236,166 miles.

In its report dated December 21, 1909, the Commission stated that for the year ending June 30, 1908, substantially complete returns had been received for 230,494 miles of line operated, including 8,661.34 miles used under trackage rights. These are the official figures of mileage for 1908, which will be used in all subsequent comparisons with the Bureau's figures for 1909—the latter, however, may include some switching and terminal mileage excluded from the former.

Of the mileage reporting to this Bureau, 8,927 miles were operated under trackage rights, leaving a net of 212,205 miles of line covered by capitalization and rental.

Assuming that the total operated mileage in the United States at the close of the fiscal year 1909 was 234,182, the complete returns to this Bureau cover approximately 94.4% of the mileage and 97% of the traffic of all the railways in the United States. No attempt has been made, or will be made, to segregate the returns of switching and terminal companies from the Bureau's figures, of which they are an integral part.

The first summary under this table presents the *operated* mileage reported to this Bureau in 1909 and 1908, classified by states and territories in comparison with the official figures of mileage owned in 1908, with relation to area and population of the respective territorial divisions:

**SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES IN 1909, 1908 AND 1907 AND ITS RELATION
TO AREA AND POPULATION.**

	Bureau's Figures		1907* Owned (Official) Miles	Miles of Line per 100 Sq. Miles of Territory	Inhabi- tants per Mile of Line
	1909 Operated Miles	1908 Operated Miles			
Alabama.....	4,917	4,644	4,840	9.77	406
Arkansas.....	3,996	3,758	4,861	9.21	301
California.....	6,376	6,251	6,664	4.38	243
Colorado.....	5,229	5,096	5,295	5.11	114
Connecticut.....	930	936	1,016	20.96	999
Delaware.....	342	343	336	17.14	615
Florida.....	3,117	2,960	3,970	7.39	148
Georgia.....	6,485	6,293	6,783	11.65	361
Idaho.....	1,651	1,568	1,731	2.09	102
Illinois.....	13,216	12,796	12,137	21.80	442
Indiana.....	7,774	7,326	7,259	20.24	388
Iowa.....	9,923	9,865	9,867	17.87	252
Kansas.....	9,125	9,175	8,936	10.94	184
Kentucky.....	3,229	3,205	3,441	8.71	690
Louisiana.....	3,860	3,805	4,558	10.43	326
Maine.....	1,984	1,750	2,093	7.19	361
Maryland.....	1,325	1,278	1,432	14.90	906
Massachusetts.....	2,079	2,079	2,112	26.45	1,492
Michigan.....	8,384	8,312	8,941	15.63	302
Minnesota.....	8,258	8,100	8,246	10.46	236
Mississippi.....	3,545	3,281	4,081	9.00	416
Missouri.....	8,200	8,141	8,039	11.79	429
Montana.....	3,537	3,406	3,307	2.28	91
Nebraska.....	6,099	6,083	5,932	7.76	200
Nevada.....	1,621	1,540	1,700	1.55	28
New Hampshire.....	1,211	1,211	1,248	13.86	369
New Jersey.....	2,046	2,046	2,250	30.59	917
New York.....	8,106	7,989	8,472	17.86	957
North Carolina.....	3,567	3,332	4,385	9.21	473
North Dakota.....	4,026	4,025	3,906	5.56	118
Ohio.....	8,951	9,041	9,261	22.75	502
Oklahoma.....	5,572	5,532	5,488	7.84	202
Oregon.....	1,687	1,600	1,939	2.07	237
Pennsylvania.....	10,532	10,224	11,259	25.25	621
Rhode Island.....	192	190	208	20.11	2,262
South Carolina.....	2,892	2,975	3,271	11.02	451
South Dakota.....	3,646	3,568	3,703	4.82	122
Tennessee.....	3,283	3,528	3,725	9.01	600
Texas.....	12,847	12,932	12,932	4.95	263
Utah.....	1,820	1,772	1,957	2.42	156
Vermont.....	941	926	1,071	11.98	351
Virginia.....	4,099	3,900	4,056	10.43	495
Washington.....	3,353	3,207	3,767	5.69	152
West Virginia.....	2,846	2,777	3,264	13.62	320
Wisconsin.....	7,039	6,900	7,459	14.01	304
Wyoming.....	1,429	1,414	1,526	1.56	70
Arizona.....	1,705	1,684	1,928	1.71	71
New Mexico.....	2,782	2,521	2,965	2.42	74
District of Columbia.....	51	42	31	53.53	9,709
Canada†.....	1,343	1,273	.....	.....	.....
United States.....	221,132	216,460	227,671	7.74	370

*Official mileage by States not available for 1908.

†Mileage operated in Canada by American roads.

RAILWAY MILEAGE OF FOREIGN COUNTRIES.

The ratios of railway mileage to area and population in the table on page 19 may be compared with those of foreign countries for 1907 in the following statement:

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE TO THE AREA AND POPULATION OF EACH COUNTRY IN 1907.

From Archiv fur Eisenbahnwesen, May-June, 1909.

Countries	Miles 1907	Miles of Line per 100 Square Miles	Inhabi- tants per Mile of Line
Europe:			
Germany.....	36,065	17.2	1,563
Austria-Hungary.....	25,852	10.0	1,818
Great Britain and Ireland.....	23,084	19.0	1,785
France.....	29,716	14.2	1,316
Russia in Europe and Finland (2,057 miles).....	36,279	1.8	2,941
Italy.....	10,312	9.3	3,125
Belgium.....	4,874	42.8	1,370
Netherlands and Luxemburg.....	2,230	15.0	2,564
Switzerland.....	2,763	12.2	1,205
Spain.....	9,227	4.8	1,923
Portugal.....	1,689	4.7	3,226
Denmark.....	2,141	14.3	1,150
Norway.....	1,606	1.3	1,390
Sweden.....	8,321	4.8	617
Servia.....	379	2.1	6,666
Roumania.....	1,994	3.2	2,941
Greece.....	771	3.1	3,125
Turkey in Europe, Bulgaria and Rumelia.....	1,967	1.9	5,000
Malta, Jersey and Isle of Man.....	68	16.1	5,273
Total for Europe, 1907.....	199,345	5.3	1,887
" " " 1906.....	196,437	5.2	1,993
" " " 1905.....	192,507	5.1	2,084
" " " 1904.....	189,806	5.0	2,084
" " " 1903.....	186,685	5.0	2,084
" " " 1902.....	183,989	4.9	2,127
" " " 1901.....	180,817	4.8	2,174
" " " 1900.....	176,396	4.7	2,220
" " " 1899.....	172,953	4.6	2,220
" " " 1898.....	167,614	4.4	.....
" " " 1897.....	163,550	4.3	.....
" " " 1896.....	160,030	4.2	.....
Increase in eleven years.....	39,315	.....	.....
Other Foreign Countries in 1907:			
Canada.....	22,447	0.6	373
Mexico.....	13,612	1.8	321
Brazil.....	10,713	.32	1,408
Argentine Republic.....	13,673	1.3	356
Peru.....	1,332	.32	3,449
Uruguay.....	1,210	1.8	769

**MILES OF LINE CONSTRUCTED DURING THE CALENDAR YEAR 1909
BY STATES AND TERRITORIES.**

State	Miles Built 1909	State	Miles Built 1909
Alaska.....	48	Montana.....	125.08
Alabama.....	35.62	Nebraska.....	13.15
Arkansas.....	155.20	Nevada.....	304.50
Arizona.....	48.02	New Hampshire.....	1.55
California.....	248.60	New Jersey.....	33.95
Colorado.....	98.13	New Mexico.....	35.00
District of Columbia.....	3.81	New York.....	52.20
Florida.....	102.81	North Carolina.....	111.92
Georgia.....	138.70	Ohio.....	18.41
Idaho.....	50.49	Oklahoma.....	168.20
Illinois.....	23.45	Oregon.....	158.38
Indiana.....	10.82	Pennsylvania.....	106.66
Kansas.....	87.21	South Carolina.....	66.14
Kentucky.....	101.52	Tennessee.....	94.26
Louisiana.....	131.57	Texas.....	650.61
Maine.....	87.00	Utah.....	28.00
Maryland.....	4.68	Virginia.....	85.75
Michigan.....	77.58	Washington.....	209.84
Minnesota.....	164.70	West Virginia.....	131.78
Mississippi.....	36.60	Wisconsin.....	68.30
Missouri.....	11.84	Wyoming.....	15.57
Total.....			4,040.60
Second track, sidings, etc.....			1,515.07
Total all tracks.....			5,555.67

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES IN 1909 AND 1908 AND ITS RELATION TO
AREA AND POPULATION—Continued.

	1908 Owned (Official) Miles	Miles of Line per 100 Sq. Miles of Territory	Inhabi- tants per Mile of Line
United States, 1909	234,182	7.88	379
“ “ 1908	230,494	7.76	378
“ “ 1907	227,671	7.74	370
“ “ 1906	222,575	7.55	373
“ “ 1905	217,018	7.34	378
“ “ 1904	212,577	7.20	379
“ “ 1903	207,187	7.00	384
“ “ 1902	201,673	6.82	388
“ “ 1901	196,075	6.64	391
“ “ 1900	192,941	6.51	393
“ “ 1899	188,277	6.37	395
“ “ 1898	185,371	6.28	394
“ “ 1897	182,920	6.21	390
“ “ 1896	181,154	6.15	384
“ “ 1895	179,176	6.08	382
“ “ 1894	176,603	6.02	379
“ “ 1893	170,332	5.94	377
“ “ 1892	165,691	5.78	380
“ “ 1891	164,603	5.67	380
“ “ 1890	159,272	5.51	384

The column of operated mileage in 1909 testifies to the comprehensive character of the reports to this Bureau, while the last two columns demonstrate how railway extension has kept pace with the growth of the country. Territorially the United States now has 43% more railway mileage than it had in 1890, and the last column proves that the mileage is greater proportionately to the population than it was twenty years ago. The contrast in the density of population per mile of line between Rhode Island and Nevada is illustrative of the startling diversity of conditions under which railways are operated in the United States.

RAILWAYS BUILT IN 1909.

The new mileage reported as constructed in 1909 tallies more nearly than usual with the increase in mileage for which operating reports are received. As reported in the *Railway and Engineering Review*, February 19, 1910, the new mileage by states was as follows:

**MILES OF LINE CONSTRUCTED DURING THE CALENDAR YEAR 1909
BY STATES AND TERRITORIES.**

State	Miles Built 1909	State	Miles Built 1909
Alaska	48	Montana	125.08
Alabama	35.62	Nebraska	13.15
Arkansas	155.20	Nevada	304.50
Arizona	48.02	New Hampshire	1.55
California	248.60	New Jersey	33.95
Colorado	98.13	New Mexico	35.00
District of Columbia	3.81	New York	52.20
Florida	102.81	North Carolina	111.92
Georgia	138.70	Ohio	18.41
Idaho	50.49	Oklahoma	163.20
Illinois	23.45	Oregon	158.38
Indiana	10.82	Pennsylvania	106.66
Kansas	87.21	South Carolina	66.14
Kentucky	101.52	Tennessee	94.26
Louisiana	131.57	Texas	650.61
Maine	87.00	Utah	28.00
Maryland	4.68	Virginia	85.75
Michigan	77.58	Washington	209.84
Minnesota	164.70	West Virginia	131.78
Mississippi	36.60	Wisconsin	68.30
Missouri	11.84	Wyoming	15.57
Total			4,040.60
Second track, sidings, etc.			1,515.07
Total all tracks			5,555.67

RAILWAY MILEAGE OF FOREIGN COUNTRIES.

The ratios of railway mileage to area and population in the table on page 19 may be compared with those of foreign countries for 1907 in the following statement:

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE TO THE AREA AND POPULATION OF EACH COUNTRY IN 1907.

From Archiv fur Eisenbahnwesen, May-June, 1909.

Countries	Miles 1907	Miles of Line per 100 Square Miles	Inhabi- tants per Mile of Line
Europe:			
Germany.....	36,065	17.2	1,563
Austria-Hungary.....	25,852	10.0	1,818
Great Britain and Ireland.....	23,084	19.0	1,785
France.....	29,716	14.2	1,316
Russia in Europe and Finland (2,057 miles).....	36,279	1.8	2,941
Italy.....	10,312	9.3	3,125
Belgium.....	4,874	42.8	1,370
Netherlands and Luxemburg.....	2,230	15.0	2,564
Switzerland.....	2,763	12.2	1,205
Spain.....	9,227	4.8	1,923
Portugal.....	1,689	4.7	3,226
Denmark.....	2,141	14.3	1,150
Norway.....	1,606	1.3	1,390
Sweden.....	8,321	4.8	617
Servia.....	379	2.1	6,666
Roumania.....	1,994	3.2	2,941
Greece.....	771	3.1	3,125
Turkey in Europe, Bulgaria and Rumelia.....	1,967	1.9	5,000
Malta, Jersey and Isle of Man.....	68	16.1	5,273
Total for Europe, 1907.....	199,345	5.3	1,887
" " " 1906.....	196,437	5.2	1,993
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" " " 1903.....	186,685	5.0	2,084
" " " 1902.....	183,989	4.9	2,127
" " " 1901.....	180,817	4.8	2,174
" " " 1900.....	176,396	4.7	2,220
" " " 1899.....	172,953	4.6	2,220
" " " 1898.....	167,614	4.4	.....
" " " 1897.....	163,550	4.3	.....
" " " 1896.....	160,030	4.2	.....
Increase in eleven years.....	39,315	.....	.....
Other Foreign Countries in 1907:			
Canada.....	22,447	0.6	373
Mexico.....	13,612	1.8	321
Brazil.....	10,713	.32	1,408
Argentine Republic.....	13,673	1.3	356
Peru.....	1,332	.32	3,449
Uruguay.....	1,210	1.8	769

**SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE
TO THE AREA AND POPULATION OF EACH COUNTRY IN 1907.**

From Archiv fur Eisenbahnwesen, May-June, 1909.—Continued.

Countries	Miles 1907	Miles of Line per 100 Square Miles	Inhabi- tants per Mile of Line
Other Foreign Countries in 1907—Continued:			
Chili.....	2,939	1.0	1,123
Central Russia in Asia.....	2,803	1.3	2,777
Siberia and Manchuria.....	5,664	.11	1,020
Japan.....	5,012	3.1	9,030
China.....	4,162	0.1	85,820
British India.....	29,892	1.4	10,000
New Zealand.....	2,570	2.4	324
Victoria.....	3,428	3.9	351
New South Wales.....	3,471	1.1	331
South Australia.....	1,924	0.13	183
Queensland.....	3,404	0.5	112
Egypt.....	3,445	1.0	2,830
Cape Colony.....	3,801	1.3	463
Natal.....	976	3.5	793
Transvaal.....	1,331	1.1	633
Recapitulation:			
Total for Europe.....	199,315	5.3	1,889
“ “ America.....	302,927	2.3	524
“ “ Asia.....	53,283	0.33	15,540
“ “ Africa.....	18,516	0.16	8,014
“ “ Australia.....	17,763	0.6	279
“ “ the whole world.....	591,837	.....	.....

Of the above total railway mileage for the whole world, no less than 332,360 miles, or nearly 56%, is operated in English speaking countries, the mileage of the United States alone being over 35% of the whole.

To the most casual student the disparity between the density of population to railway mileage in the United States and Europe of one to five, is as apparent as it is significant of our necessity for so much greater provision of transportation facilities per capita. If our per capita mileage were relatively the same as that of Europe, the United States would be set back to the transportation facilities of 1869, when the completion of the Union Pacific raised its total mileage to 47,254 miles. But even then it had a ratio of one mile of railway to 810 inhabitants, which was higher than Europe's ratio today.

Clearly there is nothing in the statistics of the railway mileage of the world to account for the epidemic of railway phobia that periodically convulses the people and legislatures of the United States of America.

MILEAGE OF ALL TRACKS IN 1909.

Of almost equal importance to the mileage of American railways are the auxiliary tracks upon which the extent and efficiency of their public service so largely depends. As the next statement shows, these continue to increase more rapidly than the miles of line.

SUMMARY OF MILEAGE OF SINGLE TRACK, SECOND TRACK, THIRD TRACK, FOURTH TRACK AND YARD TRACK AND SIDINGS, IN THE UNITED STATES, 1897 TO 1909.

Year	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	Total Mileage Operated (all tracks)
1909 (94.4%) Bureau.	221,132	20,637	2,186	1,491	80,669	326,115
1908 Official.....	*230,494	20,209	2,081	1,409	79,452	333,646
1907.....	227,455	19,421	1,960	1,390	77,749	327,975
1906.....	222,340	17,396	1,766	1,279	73,760	317,083
1905.....	216,973	17,056	1,609	1,215	69,941	306,796
1904.....	212,243	15,824	1,467	1,046	66,492	297,073
1903.....	205,313	14,681	1,303	963	61,560	283,821
1902.....	200,154	13,720	1,204	895	58,220	274,195
1901.....	195,561	12,845	1,153	876	54,914	265,352
1900.....	192,556	12,151	1,094	829	52,153	258,784
1899.....	187,543	11,546	1,047	790	49,223	250,142
1898.....	184,648	11,293	1,009	793	47,589	245,333
1897.....	183,284	11,018	995	780	45,934	242,013

*To the figures for 1908 should be added the 1,626 miles of main track and 2,085 of yard track and sidings of switching and terminal companies, excluded by the Official Statistician, raising the total of all tracks to 337,357.

By adding the auxiliary trackage reported to this Bureau for 1909 to the 234,182 miles of operated line reported to the Interstate Commerce Commission for June 30 of that year, it appears that the total of all tracks on that date was *upwards of 340,000 miles*.

It will be observed that in every instance the mileage of second, third and fourth track and yard track and sidings reported to this Bureau in 1909, the year of comparative stagnation in railway construction, exceeded the complete mileage of these tracks in 1908 reported to the Commission.

The above table (with the Commission's figures for single track) shows that where there has been an increase of only 50,798 miles of single track, or 27.7%, in twelve years, all trackage has increased over 98,000, or 42%, during the same period. It also shows that during the same twelve years second track has increased 87%; third track 120%; fourth track 91%, and yard track and sidings 76%.

MILEAGE AND TRACK OF BRITISH RAILWAYS.

As English railways are so often brought into comparison with American railways, it is well to know the total of all tracks in the United Kingdom as well as the mileage. Both are given in the following statement, compiled from returns to the British Board of Trade for the years ending December 31, 1904 to 1908:

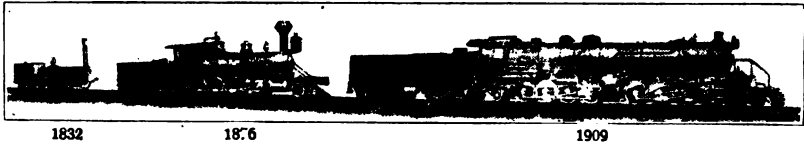
Description of Track	1908	1907	1906	1905	1904
Single track (miles).....	23,209	23,112	23,063	22,870	22,601
Second track.....	13,048	12,963	12,934	12,819	12,692
Third track.....	1,435	1,385	1,363	1,324	1,271
Fourth track.....	1,141	1,103	1,091	1,067	1,030
Fifth track.....	208	195	186	170	153
Sixth track.....	122	117	111	97	85
Seventh track.....	59	51	47	40	35
Eighth to twentieth tracks.....	94	87	75	44	34
Sidings.....	14,353	14,145	14,032	13,891	13,733
Total trackage.....	53,669	53,189	52,904	52,322	51,634

Here it will be perceived the mileage of British roads increased only 608 miles and the trackage only 2,035 miles in four years. During the same period, as shown in the preceding table, the mileage of American railways increased 18,251 miles and their total trackage 36,543. It is this continuous demand for increased mileage and trackage in the United States, to say nothing of equipment, that differentiates the problem confronting American railway management from British. In the United States we need more railways and still more railways, and the problem is to get the capital on reasonable terms to provide the facilities.

In railroad mileage alone we have over ten times that of the United Kingdom and we have more than six times as many miles of track. We have enough trackage in our yards and sidings to double track all the British railways, with enough over to put four tracks where they have only two tracks now.

II EQUIPMENT

AN OBJECT LESSON IN EQUIPMENT.



Courtesy of the Baldwin Locomotive Works.

No car shortage occurred to interrupt the orderly movement of railway traffic during the fiscal year 1908-09. On the contrary, there was an unprofitable surplus of cars throughout the year, ranging from 110,912 in September, 1908, to 333,019 in January, 1909. From this high figure the surplus was slowly reduced by the demands of traffic until subsequent to the close of the fiscal year, in September last, it reached a practical level of shortages and surpluses. During the year there was an average of 150,000 freight cars in the shops, where in times of ordinary activity the mean would be in the neighborhood of 100,000.

These conditions, which prevailed since November, 1907, account for the greatly reduced purchases of rolling stock during the years 1908 and 1909 shown in the following record of locomotives and cars built in the United States during the past eleven years:

ELEVEN YEARS' OUTPUT OF CARS AND LOCOMOTIVES.

From the Railroad Age-Gazette.

Year	Locomotives	Number Passenger Cars	Freight Cars
1909*.....	2,887	2,819	93,419
1908*.....	2,312	1,713	78,555
1907*.....	7,362	5,457	284,188
1906*.....	6,952	3,187	243,670
1905*.....	5,491	2,551	168,033
1904.....	3,441	2,141	60,806
1903.....	5,152	2,007	153,195
1902.....	4,070	1,948	162,599
1901.....	3,384	2,055	136,930
1900.....	3,153	1,636	115,631
1899.....	2,475	1,305	119,886
Total.....	46,709	26,835	1,617,905

*Includes Canadian output.

Between 1898 and 1908 the Interstate Commerce Commission reported an increase of 21,464 locomotives, 11,697 passenger cars, and 856,999 freight and company cars. Allowing for the Canadian output in the above table, this would show 22,742 more locomotives,

13,821 more passenger cars, and 674,023 more freight cars built in ten years than are accounted for in the official returns. Roughly speaking, these last figures represent the number of locomotives and cars worn out beyond repair or destroyed that have to be replaced annually. It means that provision has to be made every year for the purchase of new equipment amounting to approximately 5% of locomotives and passenger cars and 4% of freight cars in order to maintain the equipment numerically, irrespective of the sums spent on maintaining the remainder in serviceable condition.

On the equipment reported by the Commission for 1908 this would necessitate the following outlay for replacement alone:

	Number	Needed for Replacement	Average Cost	Total Cost
Locomotives.....	57,698	5% = 2,884	\$15,000	\$ 43,260,000
Passenger cars.....	45,292	5% = 2,214	6,000	13,284,000
Freight cars.....	2,100,784	4% = 84,031	1,000	84,000,000
Company cars.....	98,281	3,931	500	1,965,500
Total cost for replacing equipment.....				\$142,509,500

It is probable that the computed percentage for the replacement of locomotives and passenger cars is too high and that for freight cars too low. This is the opinion of operating officials. If so, it would amount to a set off and the aggregate would still be approximately \$142,000,000 to be expended annually for new equipment to take the place of old, worn out and discarded rolling stock. Conditions forbade the expenditure of any such sum in 1908 and 1909.

NUMBER AND CAPACITY OF LOCOMOTIVES FOR EIGHT YEARS, 1909 TO 1902.

Next follows a summary giving the number and capacity of locomotives for the seven years since the Commission has included capacity in the published returns:

Year	Number	Tractive Power (Pounds)	Weight without Tender (Tons)	Average Weight (Tons)
1909 (94.4% represented).....	55,495	1,421,114,798	4,033,309	72.7
1908 Final returns.....	57,698	No data	No data	No data
1907.....	55,388	1,429,626,658	3,828,045	69.1
1906.....	51,672	1,277,865,673	3,459,052	66.9
1905.....	48,357	1,141,330,082	3,079,673	63.6
1904.....	46,743	1,063,651,261	2,889,492	62.1
1903.....	43,871	953,799,540	2,606,587	59.4
1902.....	41,225	839,073,779	2,323,877	56.3
Increase seven years to 1908.....	34.6%	69.4%	73.6%	29.1

Complete returns will raise the totals for 1909 approximately to 57,704 locomotives of 1,465,070,000 pounds tractive power and 4,158,000 tons weight, exclusive of tenders. These figures bear out the conclusion expressed above that the purchase of new locomotives in 1909 was barely sufficient to replace those abandoned or destroyed during the year. The loss, however, was in a measure made good by the greater weight of the new engines. As the average weight of locomotives in 1899 was approximately 53 tons, the figures just given indicate an increase of nearly 114% in the weight of all locomotives during the decade.

In connection with the estimate of \$15,000 put on locomotives in this report, it is of interest to reproduce the return to the legislature of New South Wales of the cost of engines built in the railway shops at Sydney recently. The figures refer to 6-wheel-coupled heavy mail and express engines weighing, with tender, 163,128 pounds, as published in the *Railway Age-Gazette*, December 3, 1909:

DETAILS OF LOCOMOTIVE COSTS.

	10 Engines	Cost Per Engine	Per Ton †
Direct charges:			
Materials.....	\$117,462.77	\$11,746.28	\$161.29
Wages.....	76,484.23	7,648.42	104.99
Total.....	\$193,947.00	\$19,394.70	\$266.28
Indirect charges:			
Percentage of shop charges (exclusive of superintendence) on wage basis in each shop, 37.84%	28,943.79	2,894.38	39.74
Superintendence, on wage basis, 3%	2,294.51	229.45	3.10
Interest on capital cost of new shop and machinery, including land.....	4,850.52	485.05	6.63
Proportion of interest on capital cost of old shops on locomotive work produced for new engines.....	5,449.53	544.95	7.45
Depreciation of machinery and plant, 2% on capital cost.....	5,149.99	515.00	7.03
Total indirect charges.....	\$46,688.34	\$ 4,668.83	\$ 63.95
Total charges.....	\$250,635.34	\$24,063.53	\$330.23

†Ton of 2,240 lbs.

Applied to a Mallet articulated compound locomotive, such as that built for the Erie weighing 410,000 pounds on the drivers, the rate per ton paid by the government of New South Wales would make it cost over \$60,000. It did not cost any such sum, but the

Australian experience is a straw which shows how the cost of locomotives is soaring. American railways find it necessary economy to build engines whose average weight is well above that built in the government shops at Sydney.

PASSENGER AND FREIGHT CARS.

During the same period, 1902 to 1909, covered in the table relating to locomotives, for which alone full data is available, the increase in the number of passenger cars and freight cars, and in the capacity of the latter, is shown in the following statement:

Year	Passenger Service	Freight Service		Average tons	Company's Service. Number
		Number	Capacity (tons)		
1909 (97% represented).....	44,665	2,050,049	71,028,266	34.6	96,739
1908 (Final returns).....	45,292	2,100,784	No data	.....	98,281
1907.....	43,973	1,991,557	67,216,144	34	91,064
1906.....	42,282	1,837,914	59,196,230	32	78,736
1905.....	40,713	1,731,409	53,372,552	31	70,749
1904.....	39,752	1,692,194	50,874,723	30	66,615
1903.....	38,140	1,653,782	48,622,125	29	61,467
1902.....	36,987	1,546,101	43,416,977	28	57,097
Seven years' increase†.....	20.8%	35.9%	64.0%	23.5%	69.6%

†Final returns for 1909 will raise these percentages materially.

It is in the increased capacity of locomotives and cars rather than in their numbers that the seeker after truth will find the explanation of how American railways have been able to handle freight traffic that has increased in volume over 80% in ten years where numerically the increase of equipment has been less than 60%. During that period the average capacity of the freight car has increased from 27 to nearly 35 tons, accounting for an aggregate increase of 109.6%.

Between 1899 and 1909 the population of the United States increased from 74,318,000 to 88,806,000, or 19.5%. (On April 1, 1910, the treasury estimate was an even 90,000,000.) In the same ten years the number of passenger cars increased over 36%, accompanied by a steady advance in their size, strength and conveniences.

Between 1902 and 1907 the Official Statistics furnish the following information showing the gradual transformation taking place in the number and capacity of freight cars:

**NUMBER AND CAPACITY OF DIFFERENT SIZES OF FREIGHT CARS,
1902-1907.**

Class	Capacity Pounds	1902	1907	Increase or Decrease Per Cent
I	10,000	5,122	4,277	Dec. 16.5
II	20,000	15,615	7,244	" 53.5
III	30,000	46,353	10,132	" 78.1
IV	40,000	327,342	204,583	" 37.5
V	50,000	246,684	178,827	" 27.5
VI	60,000	634,626	802,187	Inc. 26.4
VII	70,000	22,493	34,652	" 53.6
VIII	80,000	158,179	452,070	" 185.9
IX	90,000	310	5,054	" 1,527.1
X	100,000	48,834	285,241	" 484.3
XII	110,000	389	1,476	" 279.4
XII	120,000	43	60	" 39.5
All over	120,000	2	214	.....

The line of cleavage between former and modern railway methods of handling freight is clearly shown in the above table to lie between cars of 25 and 30 ton capacity. The former and all of less capacity are on the decline, whereas the latter and all of greater capacity are on the increase. Numerically the 30-ton cars still exceed those of 40 and 50 tons, but already they are exceeded by the combined capacity of the latter.

THE SURPLUS OF FREIGHT CARS.

For two years (28 months as this is written) the reports of the Committee on Car Efficiency of the American Railway Association show that the supply of freight cars has been in excess of the demand. In other words, the railways during that period were paying interest on a considerable percentage of unremunerative equipment, besides the cost of its maintenance. The rise and fall of this surplus of freight cars is set forth below:

**FREIGHT CAR SHORTAGES AND SURPLUS BY MONTHS FROM JANUARY,
1907, TO APRIL, 1910.**

Month	1907 Shortage	1908 Surplus	1909 Surplus	1910 Surplus
January.....	110,000	342,580	333,019	52,309
February.....	150,000	322,513	301,571	45,513
March.....	No data	297,042	291,418	45,672
April.....	100,000	413,605	282,328	84,887
May.....	60,000	404,534	273,890	.....
June.....	40,000	349,994	262,944	.....
July*.....	20,000	308,680	243,354	.....
August*.....	15,000	253,003	159,424	.....
September.....	60,000	133,792	78,798	.....
October.....	90,757	110,912	35,977	.....
November.....	57,003	132,829	39,528	.....
December (surplus).....	209,310	222,077	58,354	.....

and August, 1907, there was a net surplus.

At the date of one report in October, 1909, a surplus of cars in one territory was practically offset by a shortage in another territory.

FREIGHT CAR PERFORMANCE.

According to Statistical Bulletin No. 58 of the Committee on Relations between Railroads of the American Railway Association, the average performance of the freight cars of American and Canadian railways during the year ending June 30, 1909, including and excluding surplus cars, was as follows:

Month	Average Miles per Day		Average Ton Miles per Car per Day	
	Including Surplus Cars	Excluding Surplus Cars	Including Surplus Cars	Excluding Surplus Cars
July, 1908.....	20.0	24.8	275	342
August, ".....	20.8	25.1	292	354
September, ".....	22.0	25.2	320	367
October, ".....	23.8	25.9	346	376
November, ".....	23.5	25.8	341	375
December, ".....	22.3	25.2	332	376
January, 1909.....	20.9	25.3	293	354
February, ".....	21.7	25.9	306	365
March, ".....	22.7	27.2	330	393
April, ".....	22.4	26.8	310	371
May, ".....	22.5	26.8	304	362
June, ".....	22.4	26.5	314	371

These figures of the average miles per day of freight cars are the delight of demagogues and other detractors of American railways who ignore, or have never been able to comprehend, that the average performance of a car per day depends from six to nine times more on the time allowed for shippers to load and unload cars than on its speed in transit. This speed runs all the way from ten to forty miles and over an hour. But if freight trains averaged 40 miles an hour it would make little impression on the per day average of cars so long as 48 hours has to be allowed as a minimum at either end for loading and unloading and almost as much more for placing notices and disposing of cars, to say nothing of time consumed in making up trains.

The salient and significant feature of this table is the proof it affords that each car of those in commission averages the movement of one ton 367 miles per day. This means an average load of 14 tons per car. It would take at least three English or European freight cars to average such a load.

SAFETY APPLIANCES.

Of all the locomotives and cars in railway service in 1908, aggregating 2,302,055, less than 4% were not fitted with train brakes, and less than three quarters of 1% were unprovided with automatic couplers.

BLOCK SIGNALS.

While the gain in mileage protected by some form of block signals in 1909 is only slightly more than half the increase in 1907, it shows a healthy revival of this most important constructive work. At the close of the last calendar year, according to the *Railroad Age-Gazette*, the mileage on which some system of block signals had been installed was as follows:

System	Single Track	Two or More Tracks	Total 1909	Total 1908
Automatic block signals (miles)	6,436	7,983	14,419	11,932
Non-automatic block signals (miles)	40,323	8,593	48,916	48,777
Total miles	46,759	16,576	63,335	60,709

Miles of line operated by the companies, 1909. 158,938

The second annual report of the government Block Signal and Train Control Board shows that little advance has been made in the search after the perfect system of automatic mechanical operation. Since the organization of the board in 1907 no less than 835 plans and descriptions of inventions designed to enhance the safety of railway operation have been submitted for its consideration. Of these 184 were examined and reported upon in 1908 and 12 were found worthy of further investigation. During the past year 327 others have been reviewed with a net result that again 12 have been found to possess enough merit to warrant the Board in conducting further tests. It finds that the vast majority of the proposed devices are unsound either in principle or design.

With regard to some form of automatic stop, the Board says that it is not yet prepared to make a definite and positive recommendation, but it thinks it reasonable to expect that several forms of automatic train controlling devices will be found available for use. In this connection it very sensibly concludes:

"It is not to be expected that trials or tests conducted by the government will, independently of extended use by railways, result in the production of devices or systems fully developed to meet all the exacting conditions of railway operation."

III

EMPLOYES AND THEIR COMPENSATION

NUMBER 1,524,400

COMPENSATION \$1,003,270,000

The 368 railway companies reporting to this Bureau had 1,463,429 persons in their employ June 30, 1909, and their pay roll for the twelve months to that date amounted to \$973,172,497. Experience has shown that these roads employ over 96% of the labor and pay 97% of the compensation earned by railway employes. From which it appears that the employes of all the railways in 1909 numbered 1,524,400, whose compensation for that year was approximately \$1,003,270,000. This would show an increase of 66,756 men employed and a decrease of \$48,362,225 in compensation—a discrepancy accounted for by the fact that the pay roll in June, 1908, was numerically at low tide while the aggregate compensation was swelled by the large pay rolls of the first six months of the fiscal year. The conditions were nearly reversed in 1909, for the pay roll was at the ebb during the first half of the year whereas the number on it did not begin to show the demands of increasing traffic until the very close of the fiscal year.

These statistics would be more enlightening if the number of employes was determined by the average from the monthly pay rolls throughout the year and not as at present "from the pay rolls on June 30." The discrepancies noted are liable to increase if the Commission succeeds in getting the permission of Congress to substitute December 31st for June 30th as the end of its statistical year. Under the present practice, the summary which follows reflects the improvement of business in the increase of employes, while their aggregate compensation continues to show the effect of the depression that prevailed throughout the greater part of the year. When, however, that compensation comes to be divided by the "Aggregate number of days worked by all employes" during the year, the daily average which results is found to be within a fraction of a cent the same as for the preceding year.

The aggregate number of days worked by the employes of the roads reporting to this Bureau was 434,328,026 days in 1909 against 453,002,228 for the preceding year.

The first summary under this title gives the number, compensation and average pay of the several classes of employes of the roads reporting for the year 1909, together with the aggregates as reported to the Interstate Commerce Commission for the preceding years.

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES IN 1909 AND 1908 AND ITS RELATION TO
AREA AND POPULATION—Continued.

	1908 Owned (Official) Miles	Miles of Line per 100 Sq. Miles of Territory	Inhabi- tants per Mile of Line
United States, 1909	234,182	7.88	379
“ “ 1908	230,494	7.76	378
“ “ 1907	227,671	7.74	370
“ “ 1906	222,575	7.55	373
“ “ 1905	217,018	7.34	378
“ “ 1904	212,577	7.20	379
“ “ 1903	207,187	7.00	384
“ “ 1902	201,673	6.82	388
“ “ 1901	196,075	6.64	391
“ “ 1900	192,941	6.51	393
“ “ 1899	188,277	6.37	395
“ “ 1898	185,371	6.28	394
“ “ 1897	182,920	6.21	390
“ “ 1896	181,154	6.15	384
“ “ 1895	179,176	6.08	382
“ “ 1894	176,603	6.02	379
“ “ 1893	170,332	5.94	377
“ “ 1892	165,691	5.78	380
“ “ 1891	164,603	5.67	380
“ “ 1890	159,272	5.51	384

The column of operated mileage in 1909 testifies to the comprehensive character of the reports to this Bureau, while the last two columns demonstrate how railway extension has kept pace with the growth of the country. Territorially the United States now has 43% more railway mileage than it had in 1890, and the last column proves that the mileage is greater proportionately to the population than it was twenty years ago. The contrast in the density of population per mile of line between Rhode Island and Nevada is illustrative of the startling diversity of conditions under which railways are operated in the United States.

RAILWAYS BUILT IN 1909.

The new mileage reported as constructed in 1909 tallies more nearly than usual with the increase in mileage for which operating reports are received. As reported in the *Railway and Engineering Review*, February 19, 1910, the new mileage by states was as follows:

**MILES OF LINE CONSTRUCTED DURING THE CALENDAR YEAR 1909
BY STATES AND TERRITORIES.**

State	Miles Built 1909	State	Miles Built 1909
Alaska	48	Montana	125.08
Alabama	35.62	Nebraska	13.15
Arkansas	155.20	Nevada	304.50
Arizona	48.02	New Hampshire	1.55
California	248.60	New Jersey	33.95
Colorado	98.13	New Mexico	35.00
District of Columbia	3.81	New York	52.20
Florida	102.81	North Carolina	111.92
Georgia	138.70	Ohio	18.41
Idaho	50.49	Oklahoma	163.20
Illinois	23.45	Oregon	158.38
Indiana	10.82	Pennsylvania	106.66
Kansas	87.21	South Carolina	66.14
Kentucky	101.52	Tennessee	94.26
Louisiana	131.57	Texas	650.61
Maine	87.00	Utah	28.00
Maryland	4.68	Virginia	85.75
Michigan	77.58	Washington	209.84
Minnesota	164.70	West Virginia	131.78
Mississippi	36.60	Wisconsin	68.30
Missouri	11.84	Wyoming	15.57
Total		4,040.60	
Second track, sidings, etc.		1,515.07	
Total all tracks		5,555.67	

the onerous and unprofitable burdens imposed on the railways by the impractical theory of administering railways through the medium of arbitrary and theoretical accounts.

AVERAGE DAILY COMPENSATION 1909-1892.

Where the data in regard to total compensation of railway employes has been kept since 1895, that of their daily average pay runs back to 1892, thus covering the period of the last preceding severe panic. Under instructions of the Official Statistician, these averages are computed by dividing the compensation paid by the actual days worked throughout the year in the several classes as nearly as it has been practicable to do so. Although the formula is more or less arbitrary, the system has been continuous and so the results are reliable for comparative purposes.

In the statement following, figures for 1895, 1896 and 1905 have been omitted to economize space, and because they present no significant variations from the years preceding them.

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF RAILWAY EMPLOYES FOR THE YEARS ENDING JUNE 30, 1908 TO 1892.

Class	1909*	1908*	1907	1906	1904	1903	1902	1901	1900	1899	1898	1897	1894	1893	1892
General officers.....	14.82	15.18	11.93	11.81	11.61	11.27	11.17	10.97	10.45	10.03	9.73	9.54	9.71	7.84	7.62
Other officers.....	6.53	6.42	5.99	5.82	6.07	5.76	5.60	5.56	5.22	5.18	5.21	5.12	5.75	.....	.....
General office clerks....	2.31	2.35	2.30	2.24	2.22	2.21	2.18	2.19	2.19	2.20	2.25	2.18	2.34	2.23	2.20
Station agents.....	2.10	2.10	2.05	1.94	1.93	1.87	1.80	1.77	1.75	1.74	1.73	1.73	1.75	1.83	1.81
Other station men.....	1.81	1.82	1.78	1.69	1.69	1.64	1.61	1.59	1.60	1.60	1.61	1.62	1.63	1.65	1.68
Enginemmen.....	4.46	4.46	4.30	4.12	4.10	4.01	3.84	3.78	3.75	3.72	3.72	3.65	3.61	3.66	3.68
Firemen.....	2.67	2.65	2.54	2.42	2.35	2.28	2.20	2.16	2.14	2.10	2.09	2.05	2.03	2.04	2.07
Conductors.....	3.76	3.83	3.69	3.51	3.50	3.38	3.21	3.17	3.17	3.13	3.13	3.07	3.04	3.08	3.07
Other trainmen.....	2.60	2.64	2.54	2.35	2.27	2.17	2.04	2.00	1.96	1.94	1.95	1.90	1.89	1.91	1.89
Machinists.....	2.98	2.95	2.87	2.69	2.61	2.50	2.36	2.32	2.30	2.29	2.28	2.23	2.21	2.33	2.29
Carpenters.....	2.43	2.40	2.40	2.28	2.26	2.19	2.08	2.06	2.04	2.03	2.02	2.01	2.02	2.11	2.08
Other shopmen.....	2.13	2.13	2.06	1.92	1.91	1.86	1.78	1.75	1.73	1.72	1.70	1.71	1.69	1.75	1.71
Section foremen.....	1.96	1.96	1.90	1.80	1.78	1.78	1.72	1.71	1.68	1.68	1.69	1.70	1.71	1.75	1.76
Other trackmen.....	1.38	1.45	1.46	1.36	1.33	1.31	1.25	1.23	1.22	1.18	1.16	1.16	1.18	1.22	1.22
Switchmen, flagmen and watchmen....	1.78	1.82	1.87	1.80	1.77	1.76	1.77	1.74	1.80	1.77	1.74	1.72	1.75	1.80	1.78
Telegraph operators and dispatchers....	2.30	2.30	2.26	2.13	2.15	2.08	2.01	1.98	1.96	1.93	1.92	1.90	1.93	1.97	1.93
Employees account floating equipment..	2.32	2.37	2.27	2.10	2.17	2.11	2.00	1.97	1.92	1.89	1.89	1.86	1.97	1.96	2.07
All other employes and laborers.....	1.98	1.98	1.92	1.83	1.82	1.77	1.71	1.69	1.71	1.68	1.67	1.64	1.65	1.70	1.67

*Averages for 1909 and 1908 are calculated from the returns to the Bureau of days worked and compensation of the several classes of roads representing 97% of the traffic.

The average pay of general officers for 1909 and 1908 in this summary is out of proportion, for the reason that the returns to the Bureau cover only 60% of the class numerically and include all the larger systems. Before 1894, this class included "Other officers," so the returns for 1893 and 1892 are not comparable with those for this class in subsequent years.

Comparing the average daily compensation of the four great classes most intimately associated in the public mind with railway operations in 1899 and 1909, it appears that during the decade the average wages of enginemen increased approximately 20%; of firemen 27%; of conductors 20%; and of other trainmen, including switchmen, brakemen and baggagemen—the most numerous body—34%.

An estimate based on the number employed and their aggregate compensation in 1899, allowing 310 working days to the year, would place the increase for all employes during the decade at 23%.

The relation of the compensation of railway employes to the gross earnings of the railways, which furnish the fund from which they are paid, and also to the sum of the expenses incurred in producing those earnings for the past ten years, is shown in the next summary, in conjunction with the operating ratio:

**SUMMARY SHOWING PROPORTION OF COMPENSATION OF EMPLOYES
TO GROSS EARNINGS AND OPERATING EXPENSES, AND OF
OPERATING RATIO TEN YEARS, 1899 TO 1909.**

	Ratio Compensation of Labor to Gross Earnings	Ratio Compensation of Labor to Operating Expenses	Ratio of Operating Expenses to Gross Earnings
1909.....	41.00%	62.06%	66.12%
1908.....	43.38%	62.33%	69.67%
1907.....	41.42%	61.41%	67.53%
1906.....	40.02%	60.79%	66.08%
1905.....	40.34%	60.40%	66.78%
1904.....	41.36%	61.07%	67.79%
1903.....	40.78%	61.65%	66.16%
1902.....	39.28%	60.58%	64.66%
1901.....	38.39%	59.27%	64.86%
1900.....	38.82%	60.04%	64.65%
1899.....	39.81%	61.04%	65.24%
increase 1899 to 1909..	3.00%	1.65%	1.35%

The significance of this statement is that in spite of all the labor saving devices and economies of operation—reduced grades, modified curves and more efficient equipment—adopted by the railways during the past decade, the proportionate cost of labor to earnings

and to expenses has increased. It reached an abnormally high ratio in 1908 because of the unprecedented recession in revenues during the second half of the year. The fact that it has been above 40% persistently since 1902 proves that labor continues to receive its full proportion of the receipts of American railways.

PAY OF EMPLOYEES ON BRITISH RAILWAYS.

Although the statistics of British railways are singularly barren of details respecting the compensation of British railway "servants," as they are termed, the reports of Boards of Conciliation afford data as to the rates of pay of several classes as follows:

SCALE OF WAGES OF DRIVERS AND FIREMEN ON NORTH BRITISH RAILWAY, 1909.

	Rate per Day of 12 Hours	
	Drivers	Firemen
Passenger engines, main line, long road.....	\$1.56	\$0.88
Passenger engines running into chief terminal station.....	1.44	.84
Passenger engines, branch lines.....	1.32	.80
Goods engines, main line, long road, trip men.....	1.44	.88
Goods engines, main line, other than long road.....	1.32	.84
Goods and mineral engines running into depots and terminal stations..	1.20	.80
Goods and mineral engines working branch lines and collieries.....	1.14	.76
Mineral pilot, pilot and shunting engines.....	1.04	.72

In his award in the case of the North Eastern Railway, Sir James Woodhouse fixed the following scales:

Firemen.—First year, 84 cents per day; 2d year, 90 cents; 3d year, 96 cents; 4th and 5th years, \$1.02; 6th year, \$1.08; 7th year, \$1.14; 8th year, and subsequent years, \$1.20. Firemen to pass for drivers during the 8th year.

Cleaners.—Age 16 to 17 years, \$2.40 per week; \$7 to 18 years, \$2.64; 18 to 19 years, \$3.12; 19 to 20 years, \$3.60; 20 to 21 years, \$4.08; and an advance of 24 cents per week for each subsequent year up to a maximum of \$4.80 per week.

"That the wages of all goods and mineral guards be increased as follows:

"(a) The wages of those who have been in receipt of \$7.20 (the maximum of the existing scale) for not less than two years shall be increased to \$7.44 per week.

"(b) The wages of those who have been in receipt of the said maximum for not less than five years shall be increased to \$7.68 per week.

"The bonus for working with large engines on freight trains discontinued when any guard becomes entitled to the maximum wages of \$7.68 per week."

Men working in the London district get from 6 to 12 cents more per day than those in outside districts.

The award in the case of the Great Northern made an addition of 24 cents to the weekly scale of the following grades: Signalmen \$4.32, \$4.56, \$4.80 and \$5.04; passenger guards and brakemen \$5.28 up to \$6.00; goods guards and brakemen \$5.04 up to \$6.24; ticket collectors \$5.04 up to \$5.52; horse shunters \$4.56 up to \$5.04; parcels porters \$4.32 to \$5.04; carriage cleaners \$4.08 to \$4.32; plate layers, second men and under men \$4.32 and less up to \$5.04; ballast train guards, flagmen and greasers rates less than \$5.04 per week.

An additional allowance of 24 cents per week is made to men stationed in the London district.

From these figures a fair idea is gained of the average pay of British railway labor. They support the statement that there are over 100,000 railway men in the United Kingdom working for less than one pound (\$4.87) a week. The total compensation paid British railway employes in 1908 was \$156,248,000 against \$162,440,000 for the preceding year. But whether the decrease was due to a reduction in pay or in numbers employed cannot be told, as there has been no census of railway "servants" since 1907. The average pay may be safely approximated at \$260 per year per man, boy and porter, who two years ago numbered 621,341.

In 1907, Special Agent Ames, of the Interstate Commerce Commission, reported wages on the railways of the United Kingdom as follows:

Enginemen.....	\$9.32 per week
Firemen.....	5.76 " "
Conductors.....	6.26 " "
Brakemen.....	6.44 " "
Shunters.....	5.80 " "
Examiners.....	5.80 " "
Signalmen.....	5.66 " "
Trackmen.....	5.58 " "

PAY OF RAILWAY EMPLOYEES IN OTHER COUNTRIES.

The contrast between the wages of American and European railway employes is emphasized by those paid on the continent. The official statistics of the empire show an increase of 5% in the average yearly compensation of German railway employes in 1908.

Their number and pay for that year to December 31st in the four main classes into which they are divided were as follows:

NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES BY PRINCIPAL DIVISIONS FOR THE YEAR ENDING DECEMBER 31, 1908.

Division	Employees Number	Compensation (Total)	Average per Year	Increase over 1907
General administration.....	31,996	\$ 25,167,240	\$787	\$64
Maintenance and guarding road.....	177,633	42,891,753	241	5
Station service and train crews.....	302,343	116,219,657	384	24
Switching crews and shops.....	187,183	75,328,084	402	18
Total.....	699,155	\$259,606,734	\$371	\$19
Increase over 1907.....	3,598	14,216,875	.....	.....

Combined with a falling off in revenues and an increase in the cost of materials this increase in the compensation of employees had the effect of raising the operating ratio of German railways from 69.01 in 1907 to 73.56 in 1908. It also increased the proportion of wages to gross earnings from 37.25 to 40.1% and had the effect of reducing the net revenues from 5.60% to 4.51% on the cost of construction.

How railway labor fares under government ownership in a republic as compared with its pay in an empire may be judged from a comparison of the following statement as to the number and pay of the railways of Switzerland with the like classes in the preceding table for Germany.

NUMBER AND PAY OF SWISS RAILWAY EMPLOYEES BY PRINCIPAL DIVISIONS IN 1907.

Division	Employees Number	Compensation (Total)	Average per Year
General administration.....	1,631	\$ 780,715	\$478
Maintenance and inspection of way.....	10,308	1,459,977	142
Transportation and train service.....	17,815	6,829,426	383
Porters and laborers.....	12,219	3,209,810	262
Total.....	41,973	\$12,279,928	\$292

The wages paid the employees of Swiss railways in 1907 amounted to only 31.9 per cent. of the gross earnings, and yet they added enough to the cost of operation to help increase the telltale ratio of expenses to revenues from 64.99 in 1906 to 67.29 in 1907. The result was increased operating expenses per mile and a decrease in

the amount available for interest in dividends from 3.26% in 1906 to 3.23% in 1907.

As the Swiss republic has to pay 3½% on government loans its investment in railways does not appear to be a very profitable one.

EMPLOYES OF FRENCH RAILWAYS.

The employees of the railways of France are divided into the following classes:

General administration.....	3,119
Transportation and traffic.....	128,823
Traction and material.....	80,732
Way and structures.....	81,897
Auxiliaries.....	82,809
Female employees.....	29,178
Total.....	406,558

The official statistics only give the compensation of employees in the division of traction and material, where the 80,732 men employed get an average of \$187 per year.

On the state railways of Belgium, firemen receive from \$15.20 to \$22.80 per month, the higher wage only after 15 years' service; enginemen begin at \$22.50 per month and at the end of 24 years' service work up to \$38.00 per month; conductors earn from \$15.97 per month up to a maximum of \$34.70; brakemen, beginning as shunters (switchmen) at 45 cents a day, when promoted get a minimum of \$17.10 per month, from which they are slowly advanced to a maximum of \$22.00. The average railway worker in Belgium gets 2.22 francs (43 cents) a day.

Whole classes of American railway employees get more in a month than Belgian railway employees average in a year.

THE COST OF LIVING.

What and how great the virtue and the art,
To live on little with a cheerful heart.—Pope.

Not because it has any legitimate place in fixing the standard of railway wages, which should be relative to the part capacity, intelligence, industry, loyalty and experience play in railway service, but because in recent years the steady increase in the cost of living has been made the fulcrum on which every lever to advance wages works, is it proper to refer to the subject in this report.

Now there is nothing in the whole wilderness of economics so utterly illusive and misleading as this same cost of living. It is as incapable of statistical expression as the airy imaginings of a dream and yet it broods over the domestic happiness of nations

with all the disquieting effects of a nightmare—and like every nightmare it comes from eating too much and wanting to eat more.

In economics, beyond the barest subsistence, the cost of living is not ruled by necessity but by individual choice. Each person and family settles it along the lines of abstinence or indulgence. It ranges from the "dinner of herbs where love is" and the virtues of self-denial are nourished, to the feasts of Lucullus and Pompeian profligacy in whose indulgence whole peoples have perished.

In every discussion of the subject first consideration is given to the price of food. This amounts to measuring the cost of living with an elastic string. The proportion of the cost of food to the cost of living varies in every land, in every occupation and in every household. It amounts to less than 40% in an average American family, but each family fixes it for itself. Following certain well recognized economic laws the percentages for subsistence increases as the income decreases. For instance, in France families with an income of under \$4.80 per week spend 63% of it for food alone, whereas those with \$9.60 a week spend 53%. In England, families averaging \$5.12 a week spend 67% on food, while those of \$9.60 spend 57% or less. In Germany, a similar inquiry showed that families with an average income of \$4.23 per week spent 68.7% on food (excluding beer), or 69.5% (with beer); whereas families with an income of \$9.60 per week spent less than 57% on food "excluding beer."

The exhaustive investigation made by Commissioner Carroll D. Wright when head of the Bureau of Labor in 1903 anticipated for the United States these results of more recent European inquiries, as appears from the following table showing the per cent of total expenditure made for various purposes in normal families according to classified incomes:

PER CENT OF EXPENDITURE FOR VARIOUS PURPOSES IN 11,156
NORMAL FAMILIES, BY CLASSIFIED INCOMES, 1901.

Classified income	Rent	Fuel	Lighting	Food	Clothing	Sundries
Under \$200.....	16.93	6.69	1.27	50.85	8.68	15.58
\$200 or under \$300.....	18.02	6.09	1.13	47.33	8.66	18.77
\$300 or under \$400.....	18.69	5.97	1.14	48.09	10.02	16.09
\$400 or under \$500.....	18.57	5.54	1.12	46.88	11.39	16.50
\$500 or under \$600.....	18.43	5.09	1.12	46.16	11.98	17.22
\$600 or under \$700.....	18.48	4.65	1.12	43.48	12.88	19.39
\$700 or under \$800.....	18.17	4.14	1.12	41.44	13.50	21.63
\$800 or under \$900.....	17.07	3.87	1.10	41.37	13.57	23.02
\$900 or under \$1000.....	17.58	3.85	1.11	39.90	14.35	23.21
\$1000 or under \$1100.....	17.53	3.77	1.16	38.79	15.06	23.69
\$1100 or under \$1200.....	16.59	3.63	1.08	37.68	14.89	26.13
\$1200 or over.....	17.40	3.85	1.18	36.45	15.72	25.40
All classes.....	18.12	4.57	1.12	43.13	12.95	20.11

While it is scarcely believable that many American families with incomes under \$200 spent less than \$100 a year on food—the European percentage in such cases being more credible—there is no reason to question the general economic law reflected in this table, that “the proportion of income spent on food diminishes as the income increases.” But it is governed more by individual tendencies, character and taste than by any rule or principle. Each family works out the problem on its own account.

According to the evidence presented at recent arbitration hearings in this city, American switchmen, as a body, belong in the classes whose family expenditures are \$1,000 or over. Irrespective of the incomes of other members of their families, the arbitrators found “that the actual monthly earnings of switchmen in the Chicago district, for those who worked full time runs from about \$85 to \$100 per month.” This means over \$1,000 yearly compensation. Therefore they are in the class which spends less than 39% of its income on food.

The average income for all railway employes engaged in train service, that is, enginemen, firemen, conductors and other trainmen, is probably above the highest figure in the above table and therefore the proportion of their income spent for food would be approximately 36%.

But accepting 40% as approximately the proportion of the pay of all railway employes spent on food, it follows that it takes only two-fifths of one per cent increase in wages to take care of an increase of one per cent in the price of food.

With this in mind it becomes instructive to follow the retail prices of the various articles of food as selected by Mr. Wright in his inquiry into the cost of living in 1901 and adopted by the Bureau of Labor in subsequent Bulletins. These for thirty articles of food for the eighteen years 1890 to 1907, as given in Bulletin No. 77 of the Bureau of Labor, and for the two years 1908-1909 as computed from Bradstreet's index and other sources of commodity prices, are given in the following statement relatively to the average price for 1890 to 1899=100:

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN
THE UNITED STATES, 1890 TO 1909.
(Average price for 1890-1899=100.0.)

Year	Apples, Evapo- rated	Beans, Dry	Beef, Fresh, Roasts	Beef, Fresh, Steaks	Beef, Salt	Bread, Wheat	Butter	Cheese	Chick- ens (year or more old), dressed	Coffee
1890.....	109.0	103.3	99.5	98.8	97.5	100.3	99.2	98.8	101.3	105.4
1891.....	110.3	106.2	100.0	99.4	98.3	100.3	106.4	100.3	104.0	105.2
1892.....	99.3	102.4	99.6	99.3	99.5	100.3	106.8	101.5	103.8	103.8
1893.....	107.0	105.0	99.0	99.6	100.3	100.1	109.9	101.8	104.2	104.8
1894.....	105.8	102.8	98.3	98.2	98.9	99.9	101.7	101.6	98.6	103.3
1895.....	97.4	100.5	98.6	99.1	99.6	99.7	97.0	99.2	98.4	101.7
1896.....	88.6	92.7	99.1	99.5	99.8	99.9	92.7	97.9	97.1	99.6
1897.....	87.8	91.5	100.3	100.2	100.9	100.0	93.1	99.0	94.0	94.6
1898.....	95.4	95.9	101.7	102.0	102.1	99.8	95.1	97.5	96.8	91.1
1899.....	99.5	99.7	103.7	103.9	103.2	99.6	97.7	102.4	101.8	90.5
1900.....	95.2	110.0	106.5	106.4	103.7	99.7	101.4	103.9	100.8	91.1
1901.....	96.8	113.9	110.7	111.0	106.1	99.4	103.2	103.3	103.0	90.7
1902.....	104.4	116.8	118.6	118.5	116.0	99.4	111.5	107.3	113.2	89.6
1903.....	100.8	118.1	113.1	112.9	108.8	100.2	110.8	109.4	113.5	89.3
1904.....	99.2	116.8	112.8	113.4	108.3	103.9	109.0	107.4	120.7	91.8
1905.....	106.0	116.3	112.2	112.9	107.9	104.5	112.7	110.9	123.6	93.6
1906.....	115.6	115.2	115.7	116.5	110.8	102.3	118.2	115.5	129.1	94.7
1907.....	124.6	118.8	119.1	120.6	114.1	104.5	127.6	123.2	131.4	95.0
1908.....	126.4	138.9	126.2	131.5	116.4	124.5	123.5	121.3	128.6	94.7
1909.....	128.6	141.2	132.6	134.1	128.2	124.5	134.8	142.0	150.2	108.6

Year	Corn Meal	Eggs	Fish, Fresh	Fish, Salt	Flour, Wheat	Lard	Milk, Fresh, un- skim- med	Molas- ses	Mut- ton	Pork, Fresh
1890.....	100.0	100.6	99.3	100.7	109.7	98.2	100.5	104.7	100.7	97.0
1891.....	109.7	106.9	99.6	101.7	112.5	99.8	100.5	101.7	100.6	98.7
1892.....	105.2	106.8	100.1	102.2	105.1	103.6	100.6	101.2	101.0	100.5
1893.....	103.1	108.1	100.1	103.4	96.1	117.9	100.4	100.6	99.9	107.0
1894.....	102.2	96.3	100.4	101.5	88.7	106.9	100.2	100.3	97.8	101.8
1895.....	100.8	99.3	99.8	98.9	89.0	100.1	100.0	99.0	98.7	99.7
1896.....	95.0	92.8	100.2	97.5	92.7	92.5	99.9	98.7	98.7	97.4
1897.....	93.7	91.4	99.8	95.2	104.3	89.8	99.7	97.7	99.6	97.6
1898.....	95.0	96.2	100.5	98.8	107.4	93.9	99.4	97.9	100.4	98.6
1899.....	95.1	101.1	100.2	100.2	94.6	97.1	98.9	98.2	102.6	101.7
1900.....	97.4	99.9	100.4	99.1	94.3	104.4	99.9	102.2	105.6	107.7
1901.....	107.1	105.7	101.4	100.9	94.4	118.1	101.1	101.3	109.0	117.9
1902.....	118.8	119.1	105.0	102.8	94.9	134.3	103.3	102.1	114.7	128.3
1903.....	120.7	125.3	107.3	108.4	101.2	126.7	105.8	103.8	112.6	127.0
1904.....	121.5	130.9	107.9	111.7	119.9	117.3	106.3	104.0	114.1	124.0
1905.....	122.2	131.6	109.9	113.8	119.9	116.6	107.0	104.4	117.8	126.6
1906.....	123.2	134.2	116.2	116.8	180.1	128.0	108.9	105.3	124.1	137.7
1907.....	131.6	137.7	120.6	121.6	117.7	134.2	116.8	107.7	130.1	142.5
1908.....	154.0	140.2	116.2	118.4	140.0	132.1	115.4	102.2	126.4	141.6
1909.....	160	142.2	120.4	122.6	154.4	153.8	141.6	106.4	134.8	168.2

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN
THE UNITED STATES, 1890 TO 1909—Continued.

(Average price for 1890-1899 = 100.0.)

Year	Pork, Salt, Bacon	Pork, Salt, dry or pickled	Pork, Salt, Ham	Pota- tores, Irish	Prunes	Rice	Sugar	Tea	Veal	Vinegar
1890.....	95.8	95.3	98.7	109.3	116.8	101.3	118.6	100.0	98.8	102.9
1891.....	96.6	98.9	99.3	116.6	116.5	102.5	102.7	100.4	99.6	105.5
1892.....	99.1	100.5	101.9	95.7	113.5	101.3	96.2	100.2	100.0	102.7
1893.....	109.0	108.7	109.3	112.3	115.6	98.4	101.5	100.1	100.0	99.5
1894.....	103.6	103.4	101.9	102.6	100.9	99.0	93.8	98.7	98.7	99.8
1895.....	99.4	99.2	98.8	91.8	94.2	98.8	91.8	98.5	98.5	98.9
1896.....	96.7	95.5	97.6	77.0	86.8	96.7	96.6	98.8	99.5	97.2
1897.....	97.4	97.3	98.2	93.0	84.3	97.9	95.7	98.5	99.9	97.4
1898.....	100.2	99.1	95.1	105.4	86.3	101.7	101.3	100.7	101.2	97.9
1899.....	102.9	101.8	99.2	96.1	85.1	102.4	101.7	104.4	103.7	98.3
1900.....	109.7	107.7	105.3	93.5	83.0	102.4	104.9	105.5	104.9	98.5
1901.....	121.0	117.5	110.2	116.8	82.6	103.5	103.0	106.7	108.8	98.9
1902.....	135.6	132.5	119.4	117.0	83.4	103.5	96.0	107.2	115.2	99.5
1903.....	139.8	129.0	121.3	114.8	80.2	103.9	96.1	106.0	114.9	99.1
1904.....	137.9	125.8	118.4	121.3	79.6	101.6	101.9	105.8	115.5	98.9
1905.....	138.8	126.0	118.5	110.2	81.4	102.6	103.9	105.7	117.7	100.3
1906.....	150.4	136.9	127.2	114.4	85.1	105.7	98.2	105.5	123.2	102.6
1907.....	157.3	141.2	130.7	120.6	88.4	108.5	99.6	105.3	125.0	104.5
1908.....	142.4	137.4	112.0	138.4	.....	105.1	100.0	108.6	124.2	112.4
1909.....	180.0	151.2	145.0	120.0	.....	103.3	105.0	109.0	130.2	113.0

No authority is claimed for the prices in these tables for the years 1908 and 1909. They merely represent the tendencies in those years, as found in official and unofficial wholesale prices of the several commodities, and there are often striking divergences between wholesale and retail prices over short periods. Eventually they follow the same course, although not always in the same proportion.

Now let us see how the average retail price of these 30 articles of food compares with the average daily pay of the four representative classes of railway employees in train service for the ten years 1899 to 1909.

Year	Average Daily Compensation				Relative Prices of Food, 1890-1899 =100
	Engine- men	Firemen	Con- ductors	Other Trainmen	
1899.....	\$3.72	\$2.10	\$3.13	\$1.94	99.6
1900.....	3.75	2.14	3.17	1.93	101.5
1901.....	3.78	2.16	3.17	2.00	105.5
1902.....	3.84	2.20	3.21	2.04	110.9
1903.....	4.01	2.28	3.38	2.17	110.9
1904.....	4.10	2.35	3.50	2.27	111.6
1905.....	4.12	2.38	3.50	2.31	112.5
1906.....	4.12	2.42	3.51	2.35	116.2
1907.....	4.30	2.54	3.69	2.54	120.7
1908.....	4.46	2.65	3.83	2.64	117.7
1909.....	4.46	2.67	3.76	2.60	127.7
Per cent. increase.....	19.9	27.1	20.1	34.0	28.2

Here it will be observed the percentage of increase in the average daily compensation of "Other trainmen" exceeds the relative increase in the price of food, that of firemen almost equals it, while that of enginemen and conductors is below it by approximately 8 points. But, as demonstrated in the table from the Eighteenth Annual Report of the Commissioner of Labor (1903), a smaller percentage of the income of enginemen and conductors is spent on food than of those employees receiving lower pay.

Moreover as only two-fifths of all expenditures is spent on food an increase of 20% in wages would take care of a 50% advance in the average price of food—provided the increase in wages were not attended by a corresponding increase in every other item entering into the cost of living.

And right here's the rub with any attempt to measure wages by the cost of living. Which is the egg and which is the hen, in the matter of precedence. Does the cost of living lay the income or does the income hatch the cost of living?

Economically and theoretically it is not up to the railways to solve this world old conundrum. Practically they are called on to meet every advance in the cost of living of their employees to which in twenty years they have not added a nickel, and they are denied the privilege, enjoyed by every other employer of labor, to add its increased cost to the price of their only commodity or service—transportation.

Today the advances in the scale of railway wages awarded, proposed and demanded mean an increase of from \$60,000,000 to \$75,000,000 in the annual "cost of living" of the railways. The

III

EMPLOYEES AND THEIR COMPENSATION

NUMBER 1,524,400

COMPENSATION \$1,003,270,000

The 368 railway companies reporting to this Bureau had 1,463,429 persons in their employ June 30, 1909, and their pay roll for the twelve months to that date amounted to \$973,172,497. Experience has shown that these roads employ over 96% of the labor and pay 97% of the compensation earned by railway employes. From which it appears that the employes of all the railways in 1909 numbered 1,524,400, whose compensation for that year was approximately \$1,003,270,000. This would show an increase of 66,756 men employed and a decrease of \$48,362,225 in compensation—a discrepancy accounted for by the fact that the pay roll in June, 1908, was numerically at low tide while the aggregate compensation was swelled by the large pay rolls of the first six months of the fiscal year. The conditions were nearly reversed in 1909, for the pay roll was at the ebb during the first half of the year whereas the number on it did not begin to show the demands of increasing traffic until the very close of the fiscal year.

These statistics would be more enlightening if the number of employes was determined by the average from the monthly pay rolls throughout the year and not as at present "from the pay rolls on June 30." The discrepancies noted are liable to increase if the Commission succeeds in getting the permission of Congress to substitute December 31st for June 30th as the end of its statistical year. Under the present practice, the summary which follows reflects the improvement of business in the increase of employes, while their aggregate compensation continues to show the effect of the depression that prevailed throughout the greater part of the year. When, however, that compensation comes to be divided by the "Aggregate number of days worked by all employes" during the year, the daily average which results is found to be within a fraction of a cent the same as for the preceding year.

The aggregate number of days worked by the employes of the roads reporting to this Bureau was 434,328,026 days in 1909 against 453,002,228 for the preceding year.

The first summary under this title gives the number, compensation and average pay of the several classes of employes of the roads reporting for the year 1909, together with the aggregates as reported to the Interstate Commerce Commission for the preceding years:

**SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF
PAY BY CLASSES IN 1909 AND AGGREGATES FROM 1889 TO 1909.**

Class 1909 (221,132 Miles Represented)	Number	Per 100 Miles of Line	Compensation	Average Pay per Day	Per Cent of Gross Receipts
General officers.....	3,312	1.6	\$15,484,008	14.82	0.6
Other officers.....	7,415	3.3	16,847,754	6.53	0.7
General office clerks.....	67,222	30	51,945,231	2.31	2.2
Station agents.....	34,765	15	24,944,100	2.10	1.0
Other station men.....	135,056	61	78,289,039	1.81	3.3
Enginemen.....	55,747	25	77,762,158	4.46	3.3
Firemen.....	58,927	27	47,591,953	2.67	2.0
Conductors.....	42,325	19	50,269,581	3.76	2.1
Other trainmen.....	112,398	51	88,751,753	2.60	3.7
Machinists.....	47,629	22	41,381,054	2.98	1.7
Carpenters.....	59,477	27	42,954,993	2.43	1.8
Other shopmen.....	192,784	87	118,891,679	2.13	5.0
Section foremen.....	39,953	18	26,377,380	1.96	1.2
Other trackmen.....	308,369	140	107,734,419	1.38	4.5
Switch tenders, crossing tenders and watchmen.....	44,155	20	26,019,105	1.78	1.1
Telegraph operators and dis- patchers.....	38,656	17	29,655,916	2.30	1.3
Employees, account floating equipment.....	8,632	4	6,537,196	2.32	0.3
All other employees and labor- ers.....	206,607	93	121,735,178	1.98	5.2
Total (94.4% mileage represented).....	1,463,429	661	\$ 973,172,497	2.24	41.00
1908 Official figures.....	1,458,244	632	\$1,051,632,225	(b) 2.25	43.38
1907.....	1,672,074	735	1,072,386,427	2.20	41.42
1906.....	1,521,355	684	(a) 930,801,653	2.09	40.02
1905.....	1,382,196	637	839,944,680	2.07	40.34
1904.....	1,296,121	611	817,598,810	No data	41.36
1903.....	1,312,537	639	775,321,415	No data	40.78
1902.....	1,189,315	594	676,028,592	No data	39.28
1901.....	1,071,169	548	610,713,701	No data	38.39
1900.....	1,017,653	529	577,264,841	No data	38.82
1899.....	928,924	495	522,967,896	No data	39.81
1898.....	874,558	474	495,055,618	No data	39.70
1897.....	823,476	449	465,601,581	No data	41.50
1896.....	826,620	454	468,824,531	No data	40.77
1895.....	785,034	441	445,508,261	No data	41.44
1894.....	779,608	444	No data	No data	.....
1893.....	873,602	515	No data	No data	.....
1892.....	821,415	506	No data	No data	.....
1891.....	784,285	486	No data	No data	.....
1890.....	749,301	479	No data	No data	.....
1889.....	704,743	459	No data	No data	.....

(a) Includes \$30,000,000 estimate pay-roll of Southern Pacific, whose records were destroyed in the San Francisco disaster.

(b) Bureau computations.

IV

CAPITALIZATION

According to the Twenty-third Annual Report of the Interstate Commerce Commission the amount of railway capital, including stocks and bonds "outstanding in the hands of the public on June 30, 1908, was \$12,840,091,462, which, if assigned on a mileage basis, shows a capitalization of \$57,230 per mile of line."

In the face of all the fustian about over-capitalization of American railways, this is a most remarkable admission, not only of their moderate, but of their decreasing capitalization per mile.

In its report on the Intercompany Relationships of Railways, dated March 10, 1908, the Commission found that as the result of its investigation the figure for railway capital outstanding in the hands of the public, "Measuring the claim of railway securities on railway revenues," reduced the amount "from \$67,936 per mile of line (1906) to \$58,050 per mile of line."

Of course there was never any justification for using the larger sum as a true measure of railway capitalization, for it was known to contain at least 15% duplicated capital.

In its Statistics of Railways for the year ending June 30, 1907, the Commission gave the net amount of railway capital outstanding in the hands of the public at that date, "assigned on a mileage basis as \$58,298 per mile of line," or \$1,068 more than the figure reported for 1908.

As the computation for 1908 was made on a basis of 224,363 miles of line, this would indicate a shrinkage of no less than \$239,616,480 in the par value of railway capital. It is needless to say there was no such shrinkage.

NET CAPITALIZATION IN 1909.

Following the earlier judgment of the Official Statistician, this Bureau seeks to arrive at a fair approximation of the capitalization of the railways of the United States through the reports of operating roads and the capitalization of the rentals paid for leased roads. This, in the more recent language of the Statistician, furnishes the only capitalization that "measures the claim of railway securities on railway revenues."

the onerous and unprofitable burdens imposed on the railways by the impractical theory of administering railways through the medium of arbitrary and theoretical accounts.

AVERAGE DAILY COMPENSATION 1909-1892.

Where the data in regard to total compensation of railway employes has been kept since 1895, that of their daily average pay runs back to 1892, thus covering the period of the last preceding severe panic. Under instructions of the Official Statistician, these averages are computed by dividing the compensation paid by the actual days worked throughout the year in the several classes as nearly as it has been practicable to do so. Although the formula is more or less arbitrary, the system has been continuous and so the results are reliable for comparative purposes.

In the statement following, figures for 1895, 1896 and 1905 have been omitted to economize space, and because they present no significant variations from the years preceding them.

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF RAILWAY EMPLOYEES FOR THE YEARS ENDING JUNE 30, 1908 TO 1892.

Class	1909*	1908*	1907	1906	1904	1903	1902	1901	1900	1899	1898	1897	1894	1893	1892
General officers.....	14.82	15.18	11.93	11.81	11.61	11.27	11.17	10.97	10.45	10.03	9.73	9.54	9.71	7.84	7.62
Other officers.....	6.53	6.42	5.99	5.82	6.07	5.76	5.60	5.56	5.22	5.18	5.21	5.12	5.75	.....	.....
General office clerks...	2.31	2.35	2.30	2.24	2.22	2.21	2.18	2.19	2.19	2.20	2.25	2.18	2.34	2.23	2.20
Station agents.....	2.10	2.10	2.05	1.94	1.93	1.87	1.80	1.77	1.75	1.74	1.73	1.73	1.75	1.83	1.81
Other station men.....	1.81	1.82	1.78	1.69	1.69	1.64	1.61	1.59	1.60	1.60	1.61	1.62	1.63	1.65	1.68
Enginemen.....	4.46	4.46	4.30	4.12	4.10	4.01	3.84	3.78	3.75	3.72	3.72	3.65	3.61	3.66	3.68
Firemen.....	2.67	2.65	2.54	2.42	2.35	2.28	2.20	2.16	2.14	2.10	2.09	2.05	2.03	2.04	2.07
Conductors.....	3.76	3.83	3.69	3.51	3.50	3.38	3.21	3.17	3.17	3.13	3.13	3.07	3.04	3.08	3.07
Other trainmen.....	2.60	2.64	2.54	2.35	2.27	2.17	2.04	2.00	1.96	1.94	1.95	1.90	1.89	1.91	1.89
Machinists.....	2.98	2.95	2.87	2.69	2.61	2.50	2.36	2.32	2.30	2.29	2.28	2.23	2.21	2.33	2.29
Carpenters.....	2.43	2.40	2.40	2.28	2.26	2.19	2.08	2.06	2.04	2.03	2.02	2.01	2.02	2.11	2.08
Other shopmen.....	2.13	2.13	2.06	1.92	1.91	1.86	1.78	1.75	1.73	1.72	1.70	1.71	1.69	1.75	1.71
Section foremen.....	1.96	1.96	1.90	1.80	1.78	1.78	1.72	1.71	1.68	1.68	1.69	1.70	1.71	1.75	1.76
Other trackmen.....	1.38	1.45	1.46	1.36	1.33	1.31	1.25	1.23	1.22	1.18	1.16	1.16	1.18	1.22	1.22
Switchmen, flagmen and watchmen.....	1.78	1.82	1.87	1.80	1.77	1.76	1.77	1.74	1.80	1.77	1.74	1.72	1.75	1.80	1.78
Telegraph operators and dispatchers....	2.30	2.30	2.26	2.13	2.15	2.08	2.01	1.98	1.96	1.93	1.92	1.90	1.93	1.97	1.93
Employees account floating equipment..	2.32	2.37	2.27	2.10	2.17	2.11	2.00	1.97	1.92	1.89	1.89	1.86	1.97	1.96	2.07
All other employes and laborers.....	1.98	1.98	1.92	1.83	1.82	1.77	1.71	1.69	1.71	1.68	1.67	1.64	1.65	1.70	1.67

*Averages for 1909 and 1908 are calculated from the returns to the Bureau of days worked and compensation of the several classes of roads representing 97% of the traffic.

The average pay of general officers for 1909 and 1908 in this summary is out of proportion, for the reason that the returns to the Bureau cover only 60% of the class numerically and include all the larger systems. Before 1894, this class included "Other officers," so the returns for 1893 and 1892 are not comparable with those for this class in subsequent years.

Comparing the average daily compensation of the four great classes most intimately associated in the public mind with railway operations in 1899 and 1909, it appears that during the decade the average wages of enginemen increased approximately 20%; of firemen 27%; of conductors 20%; and of other trainmen, including switchmen, brakemen and baggagemen—the most numerous body—34%.

An estimate based on the number employed and their aggregate compensation in 1899, allowing 310 working days to the year, would place the increase for all employees during the decade at 23%.

The relation of the compensation of railway employees to the gross earnings of the railways, which furnish the fund from which they are paid, and also to the sum of the expenses incurred in producing those earnings for the past ten years, is shown in the next summary, in conjunction with the operating ratio:

**SUMMARY SHOWING PROPORTION OF COMPENSATION OF EMPLOYEES
TO GROSS EARNINGS AND OPERATING EXPENSES, AND OF
OPERATING RATIO TEN YEARS, 1899 TO 1909.**

	Ratio Compensation of Labor to Gross Earnings	Ratio Compensation of Labor to Operating Expenses	Ratio of Operating Expenses to Gross Earnings
1909.....	41.00%	62.06%	66.12%
1908.....	43.38%	62.33%	69.67%
1907.....	41.42%	61.41%	67.53%
1906.....	40.02%	60.79%	66.08%
1905.....	40.34%	60.40%	66.78%
1904.....	41.36%	61.07%	67.79%
1903.....	40.78%	61.65%	66.16%
1902.....	39.28%	60.58%	64.66%
1901.....	38.39%	59.27%	64.86%
1900.....	38.82%	60.04%	64.65%
1899.....	39.81%	61.04%	65.24%
increase 1899 to 1909..	3.00%	1.65%	1.35%

The significance of this statement is that in spite of all the labor saving devices and economies of operation—reduced grades, modified curves and more efficient equipment—adopted by the rail during the past decade, the proportionate cost of labor to the

and to expenses has increased. It reached an abnormally high ratio in 1908 because of the unprecedented recession in revenues during the second half of the year. The fact that it has been above 40% persistently since 1902 proves that labor continues to receive its full proportion of the receipts of American railways.

PAY OF EMPLOYEES ON BRITISH RAILWAYS.

Although the statistics of British railways are singularly barren of details respecting the compensation of British railway "servants," as they are termed, the reports of Boards of Conciliation afford data as to the rates of pay of several classes as follows:

SCALE OF WAGES OF DRIVERS AND FIREMEN ON NORTH BRITISH RAILWAY, 1909.

	Rate per Day of 12 Hours	
	Drivers	Firemen
Passenger engines, main line, long road.....	\$1.56	\$0.88
Passenger engines running into chief terminal station.....	1.44	.84
Passenger engines, branch lines.....	1.32	.80
Goods engines, main line, long road, trip men.....	1.44	.88
Goods engines, main line, other than long road.....	1.32	.84
Goods and mineral engines running into depots and terminal stations..	1.20	.80
Goods and mineral engines working branch lines and collieries.....	1.14	.76
Mineral pilot, pilot and shunting engines.....	1.04	.72

In his award in the case of the North Eastern Railway, Sir James Woodhouse fixed the following scales:

Firemen.—First year, 84 cents per day; 2d year, 90 cents; 3d year, 96 cents; 4th and 5th years, \$1.02; 6th year, \$1.08; 7th year, \$1.14; 8th year, and subsequent years, \$1.20. Firemen to pass for drivers during the 8th year.

Cleaners.—Age 16 to 17 years, \$2.40 per week; 17 to 18 years, \$2.64; 18 to 19 years, \$3.12; 19 to 20 years, \$3.60; 20 to 21 years, \$4.08; and an advance of 24 cents per week for each subsequent year up to a maximum of \$4.80 per week.

"That the wages of all goods and mineral guards be increased as follows:

"(a) The wages of those who have been in receipt of \$7.20 (the maximum of the existing scale) for not less than two years shall be increased to \$7.44 per week.

"(b) The wages of those who have been in receipt of the said maximum for not less than five years shall be increased to \$7.68 per week.

"The bonus for working with large engines on freight trains discontinued when any guard becomes entitled to the maximum wages of \$7.68 per week."

Men working in the London district get from 6 to 12 cents more per day than those in outside districts.

The award in the case of the Great Northern made an addition of 24 cents to the weekly scale of the following grades: Signalmen \$4.32, \$4.56, \$4.80 and \$5.04; passenger guards and brakemen \$5.28 up to \$6.00; goods guards and brakemen \$5.04 up to \$6.24; ticket collectors \$5.04 up to \$5.52; horse shunters \$4.56 up to \$5.04; parcels porters \$4.32 to \$5.04; carriage cleaners \$4.08 to \$4.32; plate layers, second men and under men \$4.32 and less up to \$5.04; ballast train guards, flagmen and greasers rates less than \$5.04 per week.

An additional allowance of 24 cents per week is made to men stationed in the London district.

From these figures a fair idea is gained of the average pay of British railway labor. They support the statement that there are over 100,000 railway men in the United Kingdom working for less than one pound (\$4.87) a week. The total compensation paid British railway employes in 1908 was \$156,248,000 against \$162,440,000 for the preceding year. But whether the decrease was due to a reduction in pay or in numbers employed cannot be told, as there has been no census of railway "servants" since 1907. The average pay may be safely approximated at \$260 per year per man, boy and porter, who two years ago numbered 621,341.

In 1907, Special Agent Ames, of the Interstate Commerce Commission, reported wages on the railways of the United Kingdom as follows:

Enginemen.....	\$9.32 per week
Firemen.....	5.76 " "
Conductors.....	6.26 " "
Brakemen.....	6.44 " "
Shunters.....	5.80 " "
Examiners.....	5.80 " "
Signalmen.....	5.66 " "
Trackmen.....	5.58 " "

PAY OF RAILWAY EMPLOYEES IN OTHER COUNTRIES.

The contrast between the wages of American and European railway employes is emphasized by those paid on the continent. The official statistics of the empire show an increase of 5% in the average yearly compensation of German railway employes in 1908

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RAILWAY STATISTICS
OF THE
UNITED STATES OF AMERICA

FOR THE YEAR ENDING JUNE 30

1909

COMPARED WITH

THE OFFICIAL REPORTS OF 1908
AND
RECENT STATISTICS OF FOREIGN RAILWAYS

PREPARED BY

SLASON THOMPSON
BUREAU OF RAILWAY NEWS AND STATISTICS



CHICAGO:
THE GUNTHER-WARREN PRINTING COMPANY
1910

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INTRODUCTION

TO THE

STATISTICS OF AMERICAN RAILWAYS FOR 1909

"The function of accounts is to record facts. True accounting is nothing more, nor nothing less, than the correct statement of what in fact has taken place, and the measurement of that fact in an appropriate figure."—Prof. Henry C. Adams.

To be of the highest value, statistics must be accurate, uniform and continuous.

In the United States the government statistics of railways have the appearance of being gathered, compiled and disseminated to discredit and harass the great industry the government is pledged to foster as well as regulate. In no other civilized country on earth is the function of statistics so abused.

Nothing in the nature of statistics under official authority more confusing and misleading has ever been issued from the government printing office than those portions of the Twenty-third Annual Report of the Interstate Commerce Commission for the year ending June 30, 1909, purporting to deal with the financial results of the railways of the United States for the fiscal years 1908 and 1909.

On the first page of the Report the financial results of the last two fiscal years are set down thus:

	Operating Revenues	Operating Expenses	Taxes	Operating Income
1908.....	\$2,461,521,345	\$1,721,327,155	\$83,775,869	\$655,418,321
1909.....	2,494,115,589	1,662,102,172	89,026,226	742,987,191

The mileage operated in 1908 is stated as 228,164.80 and in 1909 as 233,002.67 miles.

On page 54 of the report the summary compiled from the monthly reports gives the following comparative figures for the same years:

	Total Operating Revenues	Total Operating Expenses	Net Revenue	Taxes
1908.....	\$2,421,542,094	\$1,687,144,975	\$734,397,029	\$83,775,869
1909.....	2,443,312,232	1,615,497,233	827,814,998	89,026,226

The mileage is the same as above, with the added information that the mileage operated at the end of the fiscal year 1908 was 229,952.36; and at the end of 1909, 234,182.70.

It will be observed that the taxes in both summaries are identical, but in one they are subtracted from net revenues and in the other they are not.

An insert facing page 54, giving the details of the monthly reports from which the table on that page is compiled, reveals the common source of both sets of returns and gives the key to the discrepancy between them. This is no less than the inclusion in the former of the revenues and expenses from "outside operations," which are excluded from the summary on page 54, in which the "net revenue" only from such outside source is mentioned and added to the net revenue from rail operations.

The impropriety and inaccuracy of such accounting becomes manifest when its effect is seen to vary the ratio of operating expenses to earnings from 69.67% to 69.93% in 1908, and from 66.12% to 66.64% in 1909.

On pages 64 and 65 appears another set of income figures for the year ending June 30, 1908. This is compiled from the annual reports of the carriers operating 230,494 miles of line, from which *the mileage of switching and terminal companies is excluded*. It supplies the following summary:

YEAR ENDING JUNE 30, 1908.

Rail operations:	
Operating revenues	\$2,393,805,989
Operating expenses	1,669,547,876
Net operating revenue	724,258,113
Taxes	78,673,794
Net revenue from outside operations	5,977,268
Operating income	651,561,587
Ratio of operating expenses to earnings	69.72

As these figures are compiled from the only returns which furnish data respecting all the various phases of railway operation in the United States, they will be accepted in subsequent pages as the official returns for 1908.

The above figures are exclusive of returns from switching and terminal companies, whose earnings, according to the monthly reports in 1908, were \$23,028,773; expenses, \$16,383,481, and taxes, \$1,245,261.

GROSSLY EXAGGERATED DIVIDENDS.

But these are venial variations compared to the deliberate misrepresentation as to dividends on page 62 of the report, where it is stated:

"The amount of dividends declared during the year was \$386,879,362, being equivalent to 7.99 per cent on dividend-paying stock. For the year ending June 30, 1907, the amount of dividends declared was \$308,088,627."

This statement is the more reprehensible because the inaccuracy of the reference to dividends in 1907 was exposed a year ago, and \$115,550,909 of the 1908 total is proved to be fictitious by the line in the condensed income statement of the report (page 65) reading: "Dividends declared from current income, \$271,388,453." It takes dividends from surplus, dividends by leased companies, and dividends from surplus of leased companies to make up that gross deception as to the dividends declared in 1908. And all these "several dividends" are only made statistically possible by including in current income \$274,450,192 "other income" NOT derived from transportation.

It is impossible to overestimate the harmful popular effect of exaggerating the dividends paid by the railways by \$80,693,665 in 1907 and \$115,550,909 in 1908. The public mind does not stop to distinguish between dividends "declared," dividends paid out of "income" and net dividends actually paid out of net earnings of railway traffic.

This whole statistical structure of fictitious dividends has been built up in successive reports upon the false premise of including intercorporate payments on both sides of the income account. What the public is entitled to know is the disposition of the gross sum paid by it for transportation services—those services which the Act to Regulate Commerce was passed to regulate.

BEWILDERING CHANGES IN NOMENCLATURE.

Scattered through the official reports for 1908 the student is confronted with numerous changes in terminology, many of which are for the better, but nearly all impair that continuity of names and phrases which is so desirable in comparative statistics. For instance, the public has been taught, by official practice, to speak of the revenues of the railways derived from the transportation of passengers, freight, mail and express, as "Gross earnings from operation." The phrase is descriptive, definite and clear. For this the Commission has substituted "Rail operations, operating revenues." Former reports spoke of "Income from operation," which now gives place to "Net operating revenue." To this is added the "net revenue from outside operations," making a "Total

net revenue," from which "Taxes accrued" are deducted, the remainder being "Operating income."

It will be perceived that this last phrase, which covers revenues from which operating expenses and taxes have been deducted and to which the net revenues from outside operations (sometimes they involve a deficit) have been added, comes perilously near the "Income from operation" of preceding reports.

The exclusion of the reports from switching and terminal companies in some instances, while they are included in others, introduces an element of perplexing uncertainty at every turn and really vitiates all comparisons with former reports.

The Commission itself seems to realize the bog into which the official statistician has plunged its accounts, when it says:

"The changes in the income account submitted in the report under consideration *are so far reaching in their results*, in a number of instances, as to impair direct or close comparison with figures for similar items in previous statistical reports."

And now it is proposed to throw all the accumulated statistics of twenty-two years out of consecutive gear by substituting the calendar for the fiscal year.

The writer has deemed the foregoing comments necessary to clear the atmosphere before proceeding to the introductory summary showing the salient features of the railway industry in 1909 compared with similar items in 1899 and 1889. The data for 1909 is compiled from the annual reports to this Bureau covering 221,132 miles of operated line, together with the monthly reports to the Commission of earnings and expenses of all classes of roads for that year, covering an average operated mileage of 233,002.

**SUMMARY OF RAILWAY RESULTS IN 1909, 1899 AND 1889, WITH
PERCENTAGES OF INCREASE FOR EACH ITEM BY DECADES.**

(m = 1,000.)

Item	1889	1899	1909	In- crease over 1889 %	In- crease over 1899 %
Miles of line	153,385	187,534	234,182	52.7	24.9
Miles of all track	195,958	250,784	340,000	73.5	35.5
Net capitalization (m)	\$7,366,745	\$9,432,041	\$13,508,711	83.3	43.2
Net capitalization per mile of line	48,021	51,764	57,962	20.7	11.9
Net capitalization per mile of track	37,593	38,527	39,730	5.6	3.1
Gross earnings from operation (m)	964,816	1,313,610	2,443,312	153.2	86.0
Gross earnings per mile of line	6,290	7,005	10,488	66.7	49.7
Expenses of operation (m)	644,706	856,968	1,615,497	150.5	88.4
Expenses of operation per mile of line	4,204	4,570	6,933	64.9	51.7
Net earnings from operation (m)	320,101	456,642	827,814	157.9	81.2
Net earnings per mile of line	2,086	2,435	3,552	70.2	45.8
Ratio of expenses to earnings	66.81	65.24	66.12	d 2.3	1.0
Receipts from passengers (m)	\$254,041	\$291,113	\$564,302	122.1	93.8
Receipts from freight (m)	642,662	913,737	1,682,919	161.8	84.1
Receipts from mail (m)	21,901	35,999	50,935	132.6	41.5
Receipts from express (m)	19,778	26,756	63,669	221.9	137.9
Passengers carried (m)	472,171	523,176	880,764	86.5	68.3
Passengers carried one mile (m)	11,553,820	14,591,327	29,452,000	154.8	101.8
Receipts per passenger per mile (cents)	2.165	1.978	1.916	d 11.5	d 3.1
Freight tons carried (m)	539,639	959,763	1,486,000	175.3	54.8
Freight tons carried one mile (m)	68,727,223	123,667,257	222,900,000	224.3	80.2
Receipts per ton per mile (mills)	9.22	7.24	7.55	d 17.0	4.2
Locomotives, number	29,036	36,703	57,220	97.0	55.9
Locomotives, weight (tons)	1,161,440	1,945,259	4,158,000	258.0	113.7
Passenger cars (number)	24,586	33,850	46,026	87.2	35.9
Freight cars, number	829,885	1,295,510	2,113,450	154.6	63.1
Freight cars, capacity (tons)	16,597,700	34,978,770	73,126,370	340.5	109.0
Average tons in train	179	243	388	116.9	59.6
Employees, number	704,743	928,924	1,524,000	116.2	64.0
Employees, compensation	\$389,785,664	\$522,967,896	\$1,003,270,000	157.4	91.8
Proportion of gross earnings	40.40	39.80	41.00	1.4	3.0
Proportion of operating expenses	60.46	61.02	62.10	2.7	1.7
Taxes	\$27,590,394	\$46,337,632	\$91,280,000	230.8	96.9
Per mile of line	180	247	390	116.6	57.9
Proportion of gross earnings	2.86	3.53	3.73	30.4	5.6

There is not a line or figure of this table, with its percentages of increase, that does not testify at once to the amazing growth of American railways and to the equally amazing economical basis upon which they render incalculable services to the American people on terms that challenge the admiration of less favored peoples.

REVIEW OF THE LAST THREE CALENDAR YEARS.

Where the Twenty-second Annual Report of the Interstate Commerce Commission minimized the loss inflicted on the railways by the business depression of 1908, the Twenty-third Annual Report naturally, and by reason of the same cause, minimizes the substantial recovery of 1909. Where the former showed a loss in gross earnings of only \$164,464,941 below the preceding year, when the actual result of the depression was nearly \$300,000,000 (\$298,457,576), the latter shows a recovery of only \$21,770,228, when it was approximately \$282,000,000 (\$281,934,932).

The explanation of this discrepancy is, of course, the Commission's adherence to its own fiscal periods of statistics, which do not happen, in this instance, to coincide with the ebb and flow of adversity and prosperity. The true movement of railway traffic before, during and after the recent business depression is more nearly reflected in the following figures for the calendar years 1907, 1908 and 1909, compiled from the monthly returns to the Interstate Commerce Commission, divided into periods of six months:

SUMMARY OF GROSS EARNINGS OF THE RAILWAYS DURING THE CALENDAR YEARS 1907, 1908 AND 1909, BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907	1908	1909
January.....	\$199,000,000	\$173,611,809	\$183,139,419
February.....	178,300,000	161,085,493	174,425,832
March.....	211,700,000	183,509,935	205,700,012
April.....	214,800,000	175,071,604	196,993,104
May.....	224,800,000	174,527,138	201,572,072
June.....	223,000,000	184,047,216	210,356,965
Half year.....	\$1,251,600,000	\$1,051,853,195	\$1,172,185,404
July.....	\$228,672,250	\$195,245,655	\$219,964,739
August.....	241,303,469	206,877,014	236,559,877
September.....	234,386,899	219,013,703	246,065,955
October.....	250,575,757	233,105,042	260,613,053
November.....	220,445,465	211,281,504	247,370,954
December.....	194,304,969	205,455,170	222,006,183
Half year.....	\$1,369,688,809	\$1,270,978,038	\$1,432,580,761
Total.....	2,621,288,809	2,322,831,233	2,604,766,165
Trage mileage.....	227,000	231,584	234,950
ags per mile.....	\$11,548	\$10,030	\$11,086

**SUMMARY OF OPERATING EXPENSES OF THE RAILWAYS DURING THE
CALENDAR YEARS 1907, 1908 AND 1909, BY MONTHS
AND HALF-YEARLY PERIODS, WITH RATIOS
TO GROSS EARNINGS.**

	1907	1908	1909
January	\$134,225,000	\$132,502,830	\$132,659,037
February	121,500,000	123,773,906	125,229,071
March	142,425,000	128,200,065	136,086,299
April	144,990,000	124,284,164	134,612,576
May	151,740,000	123,932,568	135,846,301
June	150,525,000	124,208,561	136,160,775
Half year	\$845,405,000	\$756,902,094	\$800,594,059
Ratio	67.7%	72%	68.3%
July	\$152,992,445	\$127,978,304	\$141,613,967
August	156,837,914	131,557,475	146,175,338
September	156,631,780	137,155,143	150,621,999
October	166,999,266	144,195,330	156,628,513
November	154,150,468	136,809,421	153,043,599
December	142,631,008	136,867,622	153,699,578
Half year	\$930,242,881	\$814,563,295	\$901,782,994
Ratio	68%	64.1%	62.9%
Total	\$1,775,647,881	\$1,571,465,389	\$1,702,377,053
Ratio	67.8%	67.7%	65.4%
Net operating revenue	\$845,640,928	\$751,365,844	\$902,389,113
Taxes	83,156,188	86,872,885	92,964,510
Net operating income	\$762,484,740	\$664,492,959	\$809,424,603

Through these tables the reader is able to trace the upward course of railway receipts in 1907 to their culmination in October of that year; their rapid drop to February, 1908; through the hard summer following to the gradual recovery of 1909, until in October last they reached the highest monthly total on record.

Concurrently with this story of the depression of 1908, the tale of railway distress and of the drastic measures adopted to meet the emergency can be read in the half-yearly ratios. The ratio for the fiscal year 1906-'07 was 67.53%, and the shadow of approaching trouble was shown in an increase of this ratio to 67.7% for the first six months in the table. By December this ratio had risen to 73.40%. The enormous receipts of the autumn months held the ratio for the six months down to 68%. In February, 1908, it marked the high and ruinous figure of 76.84, and from that point the trend, due to severe retrenchments, was steadily downward until it touched 60.10% in October, 1909.

The ratio of 64.1% for the second half of 1908 is the true measure of the ability of the railways to cut their expenditures to fit the times. But they were on bed rock, as the succeeding months of small receipts proved, when the ratio went up to 72.43% in January, and averaged the high figure of 68.3% for the first six months of 1909. The heavy receipts of October and November without a corresponding expansion of expenditures resulted in the phenomenally low ratios of these months. But the severity and necessities of operating conditions in December, 1909, ran the ratio of expenses up to 69.23%.

The net earnings for the three years under consideration are apt to lead to erroneous conclusions as to the effect of the depression. Neither the loss in 1908 nor the recovery in 1909 reflects the true swing of the pendulum. The one minimizes the loss, because it conceals the cessation of all constructive work, the curtailment of betterments and improvements, and the postponement of all purchases for replacements except of the most immediate and imperative nature; the other exaggerates the recovery because of heavy receipts without the resumption of the concurrent expenditures that should attend them. The railways in the fall of 1909 were simply doing business on the margin of facilities provided during the fat months of 1907 in anticipation of a continuation of prosperous times. Some idea of the extent of this margin may be gained from the parking of 400,000 freight cars in the yards with 200,000 in the shops in April, 1908. At no time since has this margin been wholly exhausted.

But a continuation of traffic on the scale of the past six months will necessitate an immediate expenditure of \$100,000,000 to \$150,000,000 for the replacement of freight cars alone.

INCOME ACCOUNT FOR THE CALENDAR YEAR 1909.

The monthly summaries issued by the Interstate Commerce Commission from time to time afford the details for the construction of the following statement of the transportation revenues and expenses of the railways for the calendar year 1909, from which the averages per mile and the ratios have been computed on the basis of 234,950 miles of operated line.

**STATEMENT OF OPERATING RECEIPTS AND EXPENSES OF THE RAIL-
WAYS OF THE UNITED STATES FOR THE CALENDAR YEAR
ENDING DECEMBER 31, 1909, WITH AMOUNTS PER
MILE AND RATIOS.**

(Average miles of line operated, 234,950.)*

	Amount	Per Mile	Ratio to Gross Earnings
Receipts from:			
Freight	\$1,796,256,314	\$ 7,645	68.96
Passengers	601,722,959	2,561	23.10
Other transportation revenues	182,706,090	777	7.01
Non-transportation sources	24,080,802	103	.93
Total revenues	\$2,604,766,165	\$11,086	100.00
Expenses:			
Maintenance of way and structures	\$ 339,167,666	\$ 1,448	13.06
Maintenance of equipment	387,155,080	1,644	14.83
Traffic expenses	53,257,408	223	2.01
Transportation	857,339,037	3,650	32.92
General expenses	65,441,053	280	2.52
Unclassified	16,809	.....	.....
Total expenses	\$1,702,377,052	\$ 7,245	65.35
Net operating revenues	902,389,112	3,841	34.65
Profit from outside operations	3,367,713	14	.....
Net revenues	\$ 905,756,825	.....	.....
Taxes	92,964,510	395	3.56
Net income	\$ 812,792,315	\$ 3,460	

*At the close of the year the reports covered 236,166 miles of operated line.

Unfortunately there are no similar figures for the calendar year 1907 with which comparisons may be made, but the official returns for the year ending June 30, 1907, when railway earnings reached their maximum before the panic of that year, afford the following instructive comparisons:

	Year to June 30, 1907	Year to Dec. 31, 1909
Gross earnings	\$2,589,105 578	\$2,604,766,165
Per mile	11,383	11,086
Operating expenses	1,748,515,814	1,702,377,053
Per mile	7,687	7,245
Ratio	67.53	65.35
Net revenues	840,589,764	902,389,112
Per mile	3,696	3,841
Taxes	80,108,006	92,964,510
Per mile	367	395

It will be perceived that while the earnings in 1909 exceeded those of 1907 by over 15½ millions they were almost \$300 less per mile, while the operating expenses were actually \$442 less per mile. The decreased operating ratio in 1909 bears unmistakeable testimony as to where the increase in net revenues came from.

With an increase of nearly 9,000 miles of line only \$339,167,665 was spent on maintenance of way and structures in 1909 against \$343,544,907 in 1907, and the urgent demands of returning activity made the expenditures on this account liberal in comparison with those for the year ending June 30, 1909, i. e. \$311,368,083, or \$1,336 per mile. It will be years before the railways recover from the economies forced on them by the loss of \$300,000,000 in revenues in 1908.

UNREGULATED REGULATION OF AMERICAN RAILWAYS.

Today the railways of the United States are "cribb'd, cabin'd and confined" in their services to the American people, not so much by the laws for their regulation as by the spirit in which those laws are administered. To the general tenor and purposes of statutory regulation the railways have become largely reconciled; but from the spirit in which the laws are sought to be enforced, there has to be continuous appeal to the courts and to the public sense of justice.

Regulation of railways has been persistently interpreted by political Commissions to spell reduction of rates and exacting conditions that would drain the purse of Fortunatus. Between 1889, when the Interstate Commerce Commission's statistics first became a valuable index of railway operation, and 1909, the average rate per ton mile has fallen from 9.22 to 7.55 mills. On the freight tonnage of 1909 this meant a reduction of over \$372,000,000 in the yearly revenues of the railways. The railways suffered that loss from their income when they needed every cent of it to maintain the people's highway in a condition to transport the people's ever-growing traffic.

The railways lost it, but who got it? The people? Search the market reports of the land, from Eastport to San Diego, and you will find incontestable proof that not one cent of these millions reached the pockets of the people, in whose name all regulation of railways is demanded and for whose benefit all reductions are claimed. The average rate on all commodities has gone down, the price of every commodity transported by the railways has gone up. Who has pocketed the difference?

**NUMBER OF CARS HANDLED BY 36 CAR SERVICE ASSOCIATIONS AND
DEMURRAGE BUREAUS DURING TWELVE MONTHS
ENDING DECEMBER, 1905-1909.**

Names of Associations and Bureaus	Twelve Months Ending December				
	1905	1906	1907	1908	1909
Alabama.....	752,982	744,548	779,402	631,487	700,393
Central New York.....	611,601	654,861	753,269	738,054	804,419
Central (St. Louis).....	863,788	908,096	919,130	838,017	1,001,136
Chicago.....	2,166,910	2,251,763	2,282,191	2,161,767	2,790,801
Cincinnati.....	675,117	748,763	771,990	635,365	712,145
Cleveland <i>a</i>	640,364	796,687	1,016,003	715,764	843,609
Colorado.....	425,140	455,540	445,900	385,260	428,760
Columbus.....	394,152	443,638	469,773	363,130	401,696
East Tennessee.....	320,855	358,733	388,066	293,597	330,055
Indiana.....	912,827	962,941	1,104,855	1,077,786	1,211,793
Intermountain.....	116,533	158,231	184,577	153,885	201,077
Lake Superior.....	332,633	371,312	415,642	338,109	370,490
Louisville Car.....	495,095	541,945	508,528	518,955	565,748
Memphis.....	235,569	258,316	255,169	239,156	224,648
Michigan.....	687,428	766,950	838,928	696,926	859,842
Missabe Range.....	30,241	37,613	42,786	42,930	51,934
Missouri Valley.....	1,538,087	1,665,882	1,910,139	1,603,758	1,863,052
Nashville.....	300,602	336,110	351,572	326,385	337,234
New York and New Jersey.....	997,304	1,100,067	1,409,161	1,248,609	1,416,831
North Carolina.....	357,474	374,710	407,257	404,334	445,398
Northeastern Pennsylvania.....	802,072	833,443	917,936	633,655	594,231
Northern.....	1,467,011	1,722,345	1,736,981	1,515,708	1,636,588
Pacific.....	761,382	972,398	1,166,886	1,147,345	1,390,648
Pacific Northwest.....	647,726	727,474	888,093	815,405	987,115
Philadelphia.....	2,056,744	2,218,755	2,326,723	1,921,142	2,508,204
Pittsburg.....	3,375,530	3,295,463	2,935,299	1,977,891	2,807,256
Southeastern.....	813,444	862,379	853,720	823,948	981,737
Southern.....	273,273	301,273	492,914	513,437	649,384
Texas.....	932,992	977,630	986,475	1,118,622	1,302,211
Toledo.....	262,875	312,329	530,617	383,870	492,127
Virginia and West Virginia.....	818,915	866,861	893,905	778,940	942,231
Western New York.....	812,409	881,640	986,962	806,488	931,185
Western (Omaha).....	622,868	718,872	770,470	733,346	775,828
Wisconsin.....	1,157,036	1,119,326	1,118,720	1,022,270	1,006,050
Total reported by 34 asso- ciations and bureaus ^b	27,659,009	29,749,894	31,858,039	27,638,339	32,569,156
Baltimore and Washington De- murrage Bureau.....	c721,428	c740,903	c735,103	588,930	672,954
Illinois and Iowa Demurrage Bureau.....	(d)	3,054,315	3,258,770	(d)	3,561,740

^aCleveland reported 10,016 lake coal cars for December, 1909.

^bThe Butte Terminal Association was superseded by the Montana Demurrage Bureau in May, 1908. The returns of the new bureau for the twelve months ending December, 1909, 448,381 cars

^cFigures apply to larger territory; change and revision of 1907, 1908 and 1909 figures made October 1, 1909.

^dNot reported.

orders that runs an endless stream through its regulating rollers. In the twelve months from December 1, 1908, to November 30, 1909, these aggregated no less than 2,223 separate orders involving amounts all the way from 47 cents to \$14,717.64, as seen in the following orders:

7100. *Larabee Flour Mills Company v. Atchison, Topeka & Santa Fe Railway Company*. September 11, 1909. Refund of \$0.47 on shipment of cotton bags from Kansas City, Mo., to Hutchinson, Kas., on account of excessive rate.

3629. *Lackawanna Steel Company v. Central Railroad Company of New Jersey*. June 26, 1909. Refund of \$14,717.64 on shipments of spiegeleisen from Newark, N. J., and Hazard, Pa., to Buffalo, N. Y., on account of excessive rates.

Multiplying these awards by the number of orders enables the reader to imagine the range of their respective pettiness or portentous possibilities.

It is doubtful if the American people, or even the Interstate Commerce Commissioners themselves, realize how the formal decisions and informal orders of the Commission are slowly but surely whittling away the safe margin of American railway profits. At the rate of two decisions every three days and forty informal orders per week, the work of incipient confiscation proceeds with remorseless enthusiasm.

With the best intentions in the world the present Interstate Commerce Commission is so enmeshed in its own anti-railway traditions, so enamored of the administrative control theories of its statistician, so covetous of unbridled, irresponsible authority to tear down where it has no constructive capacity, that anything like co-operation between the Commission and the railway management for the public good seems out of the question.

To the writer it appears that only blind rejection of facts can find any conserving element in the regulation of railways as at present administered. Signs of a helpful disposition in official acts are entirely lacking. The Senate and House calendars groan under bills for the further regulation and restriction of the railways, but not one contains a promise of relief. For not one is there a genuine public demand.

And what is the situation as this is written? It can be stated in a few lines. As a consequence of the drop of \$300,000,000 in gross earnings in 1908, the railways in 1908 and 1909 cut \$277,000,000 out of their expenditures. This was done mainly at the expense of maintenance of way and structures and in a cessation in the purchase of equipment, but the so-called economies of postponed

expenditures permeated every line of railway extension, operation and replacement. In 1908, with 6,000 more miles of track to maintain, \$18,788,217 less was spent for maintenance than in 1907, and in 1909 with 12,000 more miles of track \$32,176,824 less was expended.

Between 1897 and 1907 the expenditures for maintenance of way increased from \$159,434,403 to \$343,544,907, or over 115%. This means an increase of approximately 8% a year, or at least \$25,000,000 on present plant. Therefore at least \$43,000,000 was withheld from this essential line of railway maintenance in 1908 and fully \$82,000,000 in 1909, a total of \$125,000,000. The saving on equipment was nearly as great and is dealt with in the body of the report.

A comparison of the income accounts for the month of October, 1907 and 1908, corroborates the foregoing statement as to the economies forced on the railways by the adverse winds of regulation and business depression.

Month of October	1907	1909
Earnings from operation.....	\$250,575,757	\$260,613,053
Operating expenses.....	166,999,266	156,628,513
Net earnings.....	\$ 83,576,491	\$113,984,540
Operating ratio.....	66.64	60.10

The canker worm in this, the most promising flower of returning prosperity, is revealed in the abnormal ratio of 60.10 for October, 1909, or nearly 7% below the American average. Now this 7% on the revenues of last October means that in some way over \$16,000,000 less than normal was expended on American railways in that month alone. And October, 1909, was only a sample of how railways had cut expenses for 24 consecutive months.

That this should be so, with no reduction in the scale of wages or the price of supplies, is, in the view of the writer, a situation of serious national concern. Happily he is not charged with any commission to suggest how or where the deferred debt of nearly \$300,000,000 to efficient railway road and equipment is to be met. But that it must be met, to place the railways in as good condition as they were before the panic of 1907, when the cry was for more, not less facilities, does not admit of question. If it, together with the advance in wages now being adjusted, is to be met out of income, only an advance in freight rates can take care of it. If out of fresh capital, it can only be coaxed from the pockets of shrewd investors

by rates of interest that discount the risk attendant on the unregulated and irresponsible regulation of railway revenues, resources and responsibilities. And it is proposed to make an irresponsible Commission, unfamiliar with the necessities of the situation and unversed in the ways and means of raising capital arbiters of these necessities, ways and means.

All attempts to meet such a situation by legislation, unless it be directed to a reform of the instrumentalities of regulation, must prove ineffectual. In a broader, saner, more helpful administration of the laws already on the federal and state statute books lies the hope for the future of the great American transportation industry. "Whate'er is best administered is best."

THE BUREAU'S STATISTICS FOR 1909.

Thus far what has been written has related almost wholly to the financial aspect of the transportation industry as presented through the monthly reports of the railways. While these in their way serve as an admirable barometer in keeping the public informed as to general business conditions throughout the Union, they throw little light upon the railway operations behind the financial results. They are absolutely dumb on the main question upon which all railway legislation and regulation should hinge—adequate and efficient public service.

In the following pages the Bureau attempts to remedy this omission, in the essential particulars for the year ending June 30, 1909. The reports from which its summaries have been compiled were received almost a month earlier this year than last, but the publication of the Bureau's statistics has been delayed in order to make the usual comparisons with the Official Statistics for 1908. The writer is advised from Washington that the fault for this unusual delay rests with the Government printer—whose office is overwhelmed with Congressional and departmental work—and not with the Interstate Commerce Commission or its Bureau of Statistics and Accounts.

For the first time, the reports to this Bureau cover the division of freight movement into the seven chief commodities; the separation of revenues from Mail and Express; the distribution of expenses for injuries and damages, and the summaries of expenses for maintenance of way and equipment, traffic expenses, transportation expenses and general expenses. It is believed that with the addition of these accounts the annual report of the Bureau has become so compre-

hensive as to warrant its publication hereafter at an earlier date, without waiting on the publication of the official statistics for the preceding year.

This year the Bureau has received reports from 368 roads operating 221,132 miles of line or approximately 94.4% of the mileage and carrying over 97% of the traffic of the country. Last year reports were received covering 216,460 miles. The increase of 4,672 miles fairly represents the actual increase of railway mileage in the United States for the twelve months.

In presenting these statistics, the writer has endeavored to make them as colorless summaries of facts as an earnest desire to arrive at the truth permits. Such comment as accompanies them will be confined to comparisons and elucidation and not to the furtherance of any personal theories.

For the sake of brevity, the Interstate Commerce Commission will be referred to herein as the "Commission"; the Commission's "Statistics of Railways in the United States" as "Official Statistics" and "the year ending June 30th" will be implied before the year named unless otherwise specified.

The statements as to foreign railways are compiled from the latest official sources available.

Here the writer wishes to record his personal appreciation of the assistance rendered by the executives and accounting officials of the railways, whose co-operation has made this report possible. In the midst of increasing burdens imposed on them in reporting to federal and state commissions and legislatures, the requests for information from this Bureau might have seemed excusably negligible. The completeness of the report itself testifies to the cordiality with which the Bureau's work is viewed.

Acknowledgments are also due to Federal and State officials for their uniform courtesy in responding to the many requests from this Bureau, and the writer has been much gratified to receive from the chief government railway official of one foreign country the assurance that he considers its Annual Report "one of the most comprehensive and useful compilations of statistical matter relating to railways that has come into his hands."

SLASON THOMPSON.

CHICAGO, April 30, 1910.

I

MILEAGE IN 1909

According to the preliminary income report of the Interstate Commerce Commission for the year ending June 30, 1909, compiled from the monthly returns, the average railway mileage operated in the United States during the year was 233,002.67 miles; and the total mileage operated at the end of the year was 234,182.70.

The former total is made up of:		
Large roads operating 251 miles or more.....		214,916.86 miles
Small roads " 250 " or less.....		16,801.52 "
Switching or terminal companies.....		1,284.29 "
Total.....		233,002.67 miles

The returns to this Bureau, compiled from the annual reports for the same year, cover 221,132 miles, against 216,460 in 1908, an increase of 4,672 miles. Reports to the Commission for December, 1909, showed a total operated mileage of 236,166 miles.

In its report dated December 21, 1909, the Commission stated that for the year ending June 30, 1908, substantially complete returns had been received for 230,494 miles of line operated, including 8,661.34 miles used under trackage rights. These are the official figures of mileage for 1908, which will be used in all subsequent comparisons with the Bureau's figures for 1909—the latter, however, may include some switching and terminal mileage excluded from the former.

Of the mileage reporting to this Bureau, 8,927 miles were operated under trackage rights, leaving a net of 212,205 miles of line covered by capitalization and rental.

Assuming that the total operated mileage in the United States at the close of the fiscal year 1909 was 234,182, the complete returns to this Bureau cover approximately 94.4% of the mileage and 97% of the traffic of all the railways in the United States. No attempt has been made, or will be made, to segregate the returns of switching and terminal companies from the Bureau's figures, of which they are an integral part.

The first summary under this table presents the *operated* mileage reported to this Bureau in 1909 and 1908, classified by states and territories in comparison with the official figures of mileage owned in 1908, with relation to area and population of the respective territorial divisions:

IX

TAXES

So far as taxes are concerned, seasons of prosperity, depression and marking time are alike to American railways. The burden of their taxation knows no recession but mounts steadily, absolutely, per mile and in proportion to gross earnings.

The 368 roads reporting to this Bureau owning 182,046 miles of line and operating 221,132 miles, of which 39,086 miles were leased, paid \$82,650,214 taxes in 1909. The Commission's report for 1908 shows that the leased roads paid \$5,881,352 taxes out of their rents. Putting a conservative estimate of \$200 a mile on the 11,870 miles of line not represented in this report would add \$2,374,000 to the above figures and bring the aggregate taxes paid by the railways of the United States in 1909 up to the striking total of \$90,905,566.

How railway taxation has increased absolutely and relatively to earnings and mileage during the past twenty-one years is shown in the following statement:

TAXES ANNUALLY AND RELATIVELY, 1889 TO 1909.

Year	Taxes Paid	Per Mile	Percent- age of Earnings
1909 (Official figures).....	\$89,026,226	\$382	3.73
1908.....	84,555,146	367	3.53
1907.....	80,312,375	353	3.10
1906.....	74,785,615	336	3.21
1905.....	63,474,679	292	3.04
1904.....	61,696,354	290	3.12
1903.....	57,849,569	281	3.04
1902.....	54,465,437	272	3.15
1901.....	50,944,372	260	3.20
1900.....	48,332,273	250	3.24
1899.....	46,337,632	247	3.53
1898.....	43,828,224	237	3.51
1897.....	43,137,844	235	3.84
1896.....	39,970,791	219	3.48
1895.....	39,832,433	224	3.70
1894.....	38,125,274	216	3.56
1893.....	36,514,689	215	2.99
1892.....	34,053,495	209	2.90
1891.....	33,280,095	206	3.04
1890.....	31,207,469	199	2.96
1889.....	27,590,394	179	2.86

In this table the figures for 1909 are based on the monthly reports to the Commission and are subject to revision, but they are

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES IN 1909 AND 1908 AND ITS RELATION TO
AREA AND POPULATION—Continued.

	1908 Owned (Official) Miles	Miles of Line per 100 Sq. Miles of Territory	Inhabi- tants per Mile of Line
United States, 1909.....	234,182	7.88	379
" " 1908.....	230,494	7.76	378
" " 1907.....	227,671	7.74	370
" " 1906.....	222,575	7.55	373
" " 1905.....	217,018	7.34	378
" " 1904.....	212,577	7.20	379
" " 1903.....	207,187	7.00	384
" " 1902.....	201,673	6.82	388
" " 1901.....	196,075	6.64	391
" " 1900.....	192,941	6.51	393
" " 1899.....	188,277	6.37	395
" " 1898.....	185,371	6.28	394
" " 1897.....	182,920	6.21	390
" " 1896.....	181,154	6.15	384
" " 1895.....	179,176	6.08	382
" " 1894.....	176,603	6.02	379
" " 1893.....	170,332	5.94	377
" " 1892.....	165,691	5.78	380
" " 1891.....	164,603	5.67	380
" " 1890.....	159,272	5.51	384

The column of operated mileage in 1909 testifies to the comprehensive character of the reports to this Bureau, while the last two columns demonstrate how railway extension has kept pace with the growth of the country. Territorially the United States now has 43% more railway mileage than it had in 1890, and the last column proves that the mileage is greater proportionately to the population than it was twenty years ago. The contrast in the density of population per mile of line between Rhode Island and Nevada is illustrative of the startling diversity of conditions under which railways are operated in the United States.

RAILWAYS BUILT IN 1909.

The new mileage reported as constructed in 1909 tallies more nearly than usual with the increase in mileage for which operating reports are received. As reported in the *Railway and Engineering Review*, February 19, 1910, the new mileage by states was as follows:

MILES OF LINE CONSTRUCTED DURING THE CALENDAR YEAR 1909
BY STATES AND TERRITORIES.

State	Miles Built 1909	State	Miles Built 1909
Alaska.....	48	Montana.....	125.08
Alabama.....	35.62	Nebraska.....	13.15
Arkansas.....	155.20	Nevada.....	304.50
Arizona.....	48.02	New Hampshire.....	1.55
California.....	248.60	New Jersey.....	33.95
Colorado.....	98.13	New Mexico.....	35.00
District of Columbia.....	3.81	New York.....	52.20
Florida.....	102.81	North Carolina.....	111.92
Georgia.....	138.70	Ohio.....	18.41
Idaho.....	50.49	Oklahoma.....	163.20
Illinois.....	23.45	Oregon.....	158.38
Indiana.....	10.82	Pennsylvania.....	106.66
Kansas.....	87.21	South Carolina.....	66.14
Kentucky.....	101.52	Tennessee.....	94.26
Louisiana.....	131.57	Texas.....	650.61
Maine.....	87.00	Utah.....	28.00
Maryland.....	4.68	Virginia.....	85.75
Michigan.....	77.58	Washington.....	209.84
Minnesota.....	164.70	West Virginia.....	131.78
Mississippi.....	36.60	Wisconsin.....	68.30
Missouri.....	11.84	Wyoming.....	15.57
Total.....			4,040.60
Second track, sidings, etc.....			1,515.07
Total all tracks.....			5,555.67

**SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES BY STATES
AND TERRITORIES IN 1909 AND 1908 AND ITS RELATION TO
AREA AND POPULATION—Continued.**

	1908 Owned (Official) Miles	Miles of Line per 100 Sq. Miles of Territory	Inhabi- tants per Mile of Line
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California.....	248.60	New Jersey.....	33.95
Colorado.....	98.13	New Mexico.....	35.00
District of Columbia.....	3.81	New York.....	52.20
Florida.....	102.81	North Carolina.....	111.92
Georgia.....	138.70	Ohio.....	18.41
Idaho.....	50.49	Oklahoma.....	163.20
Illinois.....	23.45	Oregon.....	158.38
Indiana.....	10.82	Pennsylvania.....	106.66
Kansas.....	87.21	South Carolina.....	66.14
Kentucky.....	101.52	Tennessee.....	94.26
Louisiana.....	131.57	Texas.....	650.61
Maine.....	87.00	Utah.....	28.00
Maryland.....	4.68	Virginia.....	85.75
Michigan.....	77.58	Washington.....	209.84
Minnesota.....	164.70	West Virginia.....	131.78
Mississippi.....	36.60	Wisconsin.....	68.30
Missouri.....	11.84	Wyoming.....	15.57
Total.....			4,040.60
Second track, sidings, etc.....			1,515.07
Total all tracks.....			5,555.67

RAILWAY MILEAGE OF FOREIGN COUNTRIES.

The ratios of railway mileage to area and population in the table on page 19 may be compared with those of foreign countries for 1907 in the following statement:

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE TO THE AREA AND POPULATION OF EACH COUNTRY IN 1907.

From Archiv fur Eisenbahnwesen, May-June, 1909.

Countries	Miles 1907	Miles of Line per 100 Square Miles	Inhabi- tants per Mile of Line
Europe:			
Germany.....	36,065	17.2	1,563
Austria-Hungary.....	25,852	10.0	1,818
Great Britain and Ireland.....	23,084	19.0	1,785
France.....	29,716	14.2	1,316
Russia in Europe and Finland (2,057 miles).....	36,279	1.8	2,941
Italy.....	10,312	9.3	3,125
Belgium.....	4,874	42.8	1,370
Netherlands and Luxemburg.....	2,230	15.0	2,564
Switzerland.....	2,763	12.2	1,205
Spain.....	9,227	4.8	1,923
Portugal.....	1,689	4.7	3,226
Denmark.....	2,141	14.3	1,150
Norway.....	1,606	1.3	1,390
Sweden.....	8,321	4.8	617
Servia.....	379	2.1	6,666
Roumania.....	1,994	3.2	2,941
Greece.....	771	3.1	3,125
Turkey in Europe, Bulgaria and Rumelia.....	1,967	1.9	5,000
Malta, Jersey and Isle of Man.....	68	16.1	5,273
Total for Europe, 1907.....	199,345	5.3	1,887
" " " 1906.....	196,437	5.2	1,993
" " " 1905.....	192,507	5.1	2,084
" " " 1904.....	189,806	5.0	2,084
" " " 1903.....	186,685	5.0	2,084
" " " 1902.....	183,989	4.9	2,127
" " " 1901.....	180,817	4.8	2,174
" " " 1900.....	176,396	4.7	2,220
" " " 1899.....	172,953	4.6	2,220
" " " 1898.....	167,614	4.4	.....
" " " 1897.....	163,550	4.3	.....
" " " 1896.....	160,030	4.2	.....
Increase in eleven years.....	39,315	.....	.....
Other Foreign Countries in 1907:			
Canada.....	22,447	0.6	373
Mexico.....	13,612	1.8	321
Brazil.....	10,713	.32	1,408
Argentine Republic.....	13,673	1.3	356
Peru.....	1,332	.32	3,449
Uruguay.....	1,210	1.8	769

**SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF THE MILEAGE
TO THE AREA AND POPULATION OF EACH COUNTRY IN 1907.**

From Archiv fur Eisenbahnwesen, May-June, 1909.—Continued.

Countries	Miles 1907	Miles of Line per 100 Square Miles	Inhabi- tants per Mile of Line
Other Foreign Countries in 1907—Continued:			
Chili.....	2,939	1.0	1,123
Central Russia in Asia.....	2,808	1.3	2,777
Siberia and Manchuria.....	5,694	.11	1,020
Japan.....	5,012	3.1	9,090
China.....	4,162	0.1	85,820
British India.....	29,892	1.4	10,000
New Zealand.....	2,570	2.4	324
Victoria.....	3,428	3.9	351
New South Wales.....	3,471	1.1	331
South Australia.....	1,924	0.13	183
Queensland.....	3,404	0.5	112
Egypt.....	3,445	1.0	2,830
Cape Colony.....	3,804	1.3	463
Natal.....	976	3.5	793
Transvaal.....	1,331	1.1	633
Recapitulation:			
Total for Europe.....	199,315	5.3	1,889
“ “ America.....	302,927	2.3	524
“ “ Asia.....	53,283	0.38	15,540
“ “ Africa.....	18,516	0.16	8,014
“ “ Australia.....	17,763	0.6	279
“ “ the whole world.....	591,837	.....	.....

Of the above total railway mileage for the whole world, no less than 332,360 miles, or nearly 56%, is operated in English speaking countries, the mileage of the United States alone being over 35% of the whole.

To the most casual student the disparity between the density of population to railway mileage in the United States and Europe of one to five, is as apparent as it is significant of our necessity for so much greater provision of transportation facilities per capita. If our per capita mileage were relatively the same as that of Europe, the United States would be set back to the transportation facilities of 1869, when the completion of the Union Pacific raised its total mileage to 47,254 miles. But even then it had a ratio of one mile of railway to 810 inhabitants, which was higher than Europe's ratio today.

Clearly there is nothing in the statistics of the railway mileage of the world to account for the epidemic of railway phobia that periodically convulses the people and legislatures of the United States of America.

MILEAGE OF ALL TRACKS IN 1909.

Of almost equal importance to the mileage of American railways are the auxiliary tracks upon which the extent and efficiency of their public service so largely depends. As the next statement shows, these continue to increase more rapidly than the miles of line.

SUMMARY OF MILEAGE OF SINGLE TRACK, SECOND TRACK, THIRD TRACK, FOURTH TRACK AND YARD TRACK AND SIDINGS, IN THE UNITED STATES, 1897 TO 1909.

Year	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	Total Mileage Operated (all tracks)
1909 (94.4%) Bureau.	221,132	20,637	2,186	1,491	80,669	326,115
1908 Official.....	*230,494	20,209	2,081	1,409	79,452	333,646
1907.....	227,455	19,421	1,960	1,390	77,749	327,975
1906.....	222,340	17,396	1,766	1,279	73,760	317,083
1905.....	216,973	17,056	1,609	1,215	69,941	306,796
1904.....	212,243	15,824	1,467	1,046	66,492	297,073
1903.....	205,313	14,681	1,303	963	61,560	283,821
1902.....	200,154	13,720	1,204	895	58,220	274,195
1901.....	195,561	12,845	1,153	876	54,914	265,352
1900.....	192,556	12,151	1,094	829	52,153	258,784
1899.....	187,543	11,546	1,047	790	49,223	250,142
1898.....	184,648	11,293	1,009	793	47,589	245,333
1897.....	183,284	11,018	995	780	45,934	242,013

*To the figures for 1908 should be added the 1,626 miles of main track and 2,085 of yard track and sidings of switching and terminal companies, excluded by the Official Statistician, raising the total of all tracks to 337,357.

By adding the auxiliary trackage reported to this Bureau for 1909 to the 234,182 miles of operated line reported to the Interstate Commerce Commission for June 30 of that year, it appears that the total of all tracks on that date was *upwards of 340,000 miles*.

It will be observed that in every instance the mileage of second, third and fourth track and yard track and sidings reported to this Bureau in 1909, the year of comparative stagnation in railway construction, exceeded the complete mileage of these tracks in 1908 reported to the Commission.

The above table (with the Commission's figures for single track) shows that where there has been an increase of only 50,798 miles of single track, or 27.7%, in twelve years, all trackage has increased over 98,000, or 42%, during the same period. It also shows that during the same twelve years second track has increased 87%; third track 120%; fourth track 91%, and yard track and sidings 76%.

MILEAGE AND TRACK OF BRITISH RAILWAYS.

As English railways are so often brought into comparison with American railways, it is well to know the total of all tracks in the United Kingdom as well as the mileage. Both are given in the following statement, compiled from returns to the British Board of Trade for the years ending December 31, 1904 to 1908:

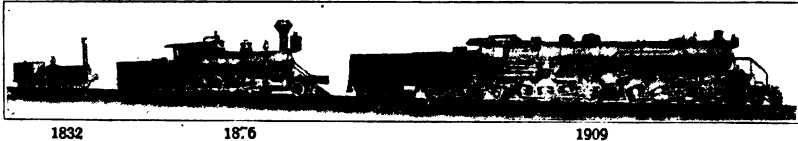
Description of Track	1908	1907	1906	1905	1904
Single track (miles).....	23,209	23,112	23,063	22,870	22,801
Second track.....	13,048	12,963	12,934	12,819	12,692
Third track.....	1,435	1,385	1,363	1,324	1,271
Fourth track.....	1,141	1,103	1,091	1,067	1,030
Fifth track.....	208	195	186	170	153
Sixth track.....	122	117	111	97	85
Seventh track.....	59	51	47	40	35
Eighth to twentieth tracks.....	94	87	75	44	34
Sidings.....	14,353	14,145	14,032	13,891	13,733
Total trackage.....	53,669	53,189	52,904	52,322	51,634

Here it will be perceived the mileage of British roads increased only 608 miles and the trackage only 2,035 miles in four years. During the same period, as shown in the preceding table, the mileage of American railways increased 18,251 miles and their total trackage 36,543. It is this continuous demand for increased mileage and trackage in the United States, to say nothing of equipment, that differentiates the problem confronting American railway management from British. In the United States we need more railways and still more railways, and the problem is to get the capital on reasonable terms to provide the facilities.

In railroad mileage alone we have over ten times that of the United Kingdom and we have more than six times as many miles of track. We have enough trackage in our yards and sidings to double track all the British railways, with enough over to put four tracks where they have only two tracks now.

II EQUIPMENT

AN OBJECT LESSON IN EQUIPMENT.



Courtesy of the Baldwin Locomotive Works.

No car shortage occurred to interrupt the orderly movement of railway traffic during the fiscal year 1908-09. On the contrary, there was an unprofitable surplus of cars throughout the year, ranging from 110,912 in September, 1908, to 333,019 in January, 1909. From this high figure the surplus was slowly reduced by the demands of traffic until subsequent to the close of the fiscal year, in September last, it reached a practical level of shortages and surpluses. During the year there was an average of 150,000 freight cars in the shops, where in times of ordinary activity the mean would be in the neighborhood of 100,000.

These conditions, which prevailed since November, 1907, account for the greatly reduced purchases of rolling stock during the years 1908 and 1909 shown in the following record of locomotives and cars built in the United States during the past eleven years:

ELEVEN YEARS' OUTPUT OF CARS AND LOCOMOTIVES.

From the Railroad Age-Gazette.

Year	Locomotives	Number Passenger Cars	Freight Cars
1909*.....	2,887	2,819	93,419
1908*.....	2,312	1,713	76,555
1907*.....	7,362	5,457	284,183
1906*.....	6,952	3,167	243,670
1905*.....	5,491	2,551	168,003
1904.....	3,441	2,144	60,806
1903.....	5,152	2,007	153,195
1902.....	4,070	1,948	162,599
1901.....	3,384	2,055	136,950
1900.....	3,153	1,636	115,631
1899.....	2,475	1,305	119,886
Total.....	46,709	26,835	1,617,905

*Includes Canadian output.

Between 1898 and 1908 the Interstate Commerce Commission reported an increase of 21,464 locomotives, 11,697 passenger cars, and 856,999 freight and company cars. Allowing for the Canadian output in the above table, this would show 22,742 more locomotives,

13,821 more passenger cars, and 674,023 more freight cars built in ten years than are accounted for in the official returns. Roughly speaking, these last figures represent the number of locomotives and cars worn out beyond repair or destroyed that have to be replaced annually. It means that provision has to be made every year for the purchase of new equipment amounting to approximately 5% of locomotives and passenger cars and 4% of freight cars in order to maintain the equipment numerically, irrespective of the sums spent on maintaining the remainder in serviceable condition.

On the equipment reported by the Commission for 1908 this would necessitate the following outlay for replacement alone:

	Number	Needed for Replacement	Average Cost	Total Cost
Locomotives	57,698	5% = 2,884	\$15,000	\$ 43,260,000
Passenger cars	45,292	5% = 2,214	6,000	13,284,000
Freight cars	2,100,784	4% = 84,031	1,000	84,000,000
Company cars	98,281	3,931	500	1,965,500
Total cost for replacing equipment				\$142,509,500

It is probable that the computed percentage for the replacement of locomotives and passenger cars is too high and that for freight cars too low. This is the opinion of operating officials. If so, it would amount to a set off and the aggregate would still be approximately \$142,000,000 to be expended annually for new equipment to take the place of old, worn out and discarded rolling stock. Conditions forbade the expenditure of any such sum in 1908 and 1909.

NUMBER AND CAPACITY OF LOCOMOTIVES FOR EIGHT YEARS, 1909 TO 1902.

Next follows a summary giving the number and capacity of locomotives for the seven years since the Commission has included capacity in the published returns:

Year	Number	Tractive Power (Pounds)	Weight without Tender (Tons)	Average Weight (Tons)
1909 (94.4% represented)	55,495	1,421,114,798	4,033,309	72.7
1908 Final returns	57,698	No data	No data	No data
1907	55,388	1,429,626,658	3,828,045	69.1
1906	51,672	1,277,865,873	3,459,052	66.9
1905	48,357	1,141,330,082	3,079,673	63.6
1904	46,743	1,063,651,261	2,889,492	62.1
1903	43,871	953,799,540	2,606,587	59.4
1902	41,225	839,073,779	2,323,877	56.3
Increase seven years to 1908	34.6%	69.4%	73.6%	29.1

Complete returns will raise the totals for 1909 approximately to 57,704 locomotives of 1,465,070,000 pounds tractive power and 4,158,000 tons weight, exclusive of tenders. These figures bear out the conclusion expressed above that the purchase of new locomotives in 1909 was barely sufficient to replace those abandoned or destroyed during the year. The loss, however, was in a measure made good by the greater weight of the new engines. As the average weight of locomotives in 1899 was approximately 53 tons, the figures just given indicate an increase of nearly 114% in the weight of all locomotives during the decade.

In connection with the estimate of \$15,000 put on locomotives in this report, it is of interest to reproduce the return to the legislature of New South Wales of the cost of engines built in the railway shops at Sydney recently. The figures refer to 6-wheel-coupled heavy mail and express engines weighing, with tender, 163,128 pounds, as published in the *Railway Age-Gazette*, December 3, 1909:

DETAILS OF LOCOMOTIVE COSTS.

	10 Engines	Cost Per Engine	Per Ton†
Direct charges:			
Materials.....	\$117,462.77	\$11,746.28	\$161.29
Wages.....	76,484.23	7,648.42	104.99
Total.....	\$193,947.00	\$19,394.70	\$266.28
Indirect charges:			
Percentage of shop charges (exclusive of superintendence) on wage basis in each shop, 37.84%	28,943.79	2,894.38	39.74
Superintendence, on wage basis, 3%.....	2,294.51	229.45	3.10
Interest on capital cost of new shop and machinery, including land.....	4,850.52	485.05	6.63
Proportion of interest on capital cost of old shops on locomotive work produced for new engines.....	5,449.53	544.95	7.45
Depreciation of machinery and plant, 2% on capital cost.....	5,149.99	515.00	7.03
Total indirect charges.....	\$46,688.34	\$ 4,668.83	\$ 63.95
Total charges.....	\$250,635.34	\$24,063.53	\$330.23

†Ton of 2,240 lbs.

Applied to a Mallet articulated compound locomotive, such as that built for the Erie weighing 410,000 pounds on the drivers, the rate per ton paid by the government of New South Wales would make it cost over \$60,000. It did not cost any such sum, but the

Australian experience is a straw which shows how the cost of locomotives is soaring. American railways find it necessary economy to build engines whose average weight is well above that built in the government shops at Sydney.

PASSENGER AND FREIGHT CARS.

During the same period, 1902 to 1909, covered in the table relating to locomotives, for which alone full data is available, the increase in the number of passenger cars and freight cars, and in the capacity of the latter, is shown in the following statement:

Year	Passenger Service	Freight Service		Average tons	Company's Service. Number
		Number	Capacity (tons)		
1909 (97% represented).....	44,665	2,050,049	71,028,266	34.6	96,739
1908 (Final returns).....	45,292	2,100,784	No data	.....	98,281
1907.....	43,973	1,991,557	67,216,144	34	91,064
1906.....	42,282	1,837,914	59,196,230	32	78,736
1905.....	40,713	1,731,409	53,372,552	31	70,749
1904.....	39,752	1,692,194	50,874,723	30	66,615
1903.....	38,140	1,653,782	48,622,125	29	61,467
1902.....	36,987	1,546,101	43,416,977	28	57,097
Seven years' increase†.....	20.8%	35.9%	64.0%	23.5%	69.6%

†Final returns for 1909 will raise these percentages materially.

It is in the increased capacity of locomotives and cars rather than in their numbers that the seeker after truth will find the explanation of how American railways have been able to handle freight traffic that has increased in volume over 80% in ten years where numerically the increase of equipment has been less than 60%. During that period the average capacity of the freight car has increased from 27 to nearly 35 tons, accounting for an aggregate increase of 109.6%.

Between 1899 and 1909 the population of the United States increased from 74,318,000 to 88,806,000, or 19.5%. (On April 1, 1910, the treasury estimate was an even 90,000,000.) In the same ten years the number of passenger cars increased over 36%, accompanied by a steady advance in their size, strength and conveniences.

Between 1902 and 1907 the Official Statistics furnish the following information showing the gradual transformation taking place in the number and capacity of freight cars:

NUMBER AND CAPACITY OF DIFFERENT SIZES OF FREIGHT CARS, 1902-1907.

Class	Capacity Pounds	1902	1907	Increase or Decrease Per Cent
I	10,000	5,122	4,277	Dec. 16.5
II	20,000	15,615	7,244	" 53.5
III	30,000	46,353	10,132	" 78.1
IV	40,000	327,342	204,583	" 37.5
V	50,000	246,684	178,827	" 27.5
VI	60,000	634,626	802,187	Inc. 26.4
VII	70,000	22,493	34,652	" 53.6
VIII	80,000	158,179	452,070	" 185.9
IX	90,000	310	5,054	" 1,527.1
X	100,000	48,834	285,241	" 484.3
XII	110,000	389	1,476	" 279.4
XII	120,000	43	60	" 39.5
All over	120,000	2	214	.....

The line of cleavage between former and modern railway methods of handling freight is clearly shown in the above table to lie between cars of 25 and 30 ton capacity. The former and all of less capacity are on the decline, whereas the latter and all of greater capacity are on the increase. Numerically the 30-ton cars still exceed those of 40 and 50 tons, but already they are exceeded by the combined capacity of the latter.

THE SURPLUS OF FREIGHT CARS.

For two years (28 months as this is written) the reports of the Committee on Car Efficiency of the American Railway Association show that the supply of freight cars has been in excess of the demand. In other words, the railways during that period were paying interest on a considerable percentage of unremunerative equipment, besides the cost of its maintenance. The rise and fall of this surplus of freight cars is set forth below:

FREIGHT CAR SHORTAGES AND SURPLUS BY MONTHS FROM JANUARY, 1907, TO APRIL, 1910.

Month	1907 Shortage	1908 Surplus	1909 Surplus	1910 Surplus
January.....	110,000	342,580	333,019	52,309
February.....	150,000	322,513	301,571	45,513
March.....	No data	297,042	291,418	45,672
April.....	100,000	413,605	282,328	84,887
May.....	60,000	404,534	273,890	.....
June.....	40,000	349,994	262,944	.....
July*.....	20,000	308,680	243,354	.....
August*.....	15,000	253,003	159,424	.....
September.....	60,000	133,792	78,798	.....
October.....	90,757	110,912	35,977	.....
November.....	57,003	132,829	39,528	.....
December (surplus).....	209,310	222,077	58,354	.....

*In July and August, 1907, there was a net surplus.

At the date of one report in October, 1909, a surplus of cars in one territory was practically offset by a shortage in another territory.

FREIGHT CAR PERFORMANCE.

According to Statistical Bulletin No. 58 of the Committee on Relations between Railroads of the American Railway Association, the average performance of the freight cars of American and Canadian railways during the year ending June 30, 1909, including and excluding surplus cars, was as follows:

Month	Average Miles per Day		Average Ton Miles per Car per Day	
	Including Surplus Cars	Excluding Surplus Cars	Including Surplus Cars	Excluding Surplus Cars
July, 1908.....	20.0	24.8	275	342
August, ".....	20.8	25.1	292	354
September, ".....	22.0	25.2	320	367
October, ".....	23.8	25.9	346	376
November, ".....	23.5	25.8	341	375
December, ".....	22.3	25.2	332	376
January, 1909.....	20.9	25.3	293	354
February, ".....	21.7	25.9	306	365
March, ".....	22.7	27.2	330	393
April, ".....	22.4	26.8	310	371
May, ".....	22.5	26.8	304	362
June, ".....	22.4	26.5	314	371

These figures of the average miles per day of freight cars are the delight of demagogues and other detractors of American railways who ignore, or have never been able to comprehend, that the average performance of a car per day depends from six to nine times more on the time allowed for shippers to load and unload cars than on its speed in transit. This speed runs all the way from ten to forty miles and over an hour. But if freight trains averaged 40 miles an hour it would make little impression on the per day average of cars so long as 48 hours has to be allowed as a minimum at either end for loading and unloading and almost as much more for placing notices and disposing of cars, to say nothing of time consumed in making up trains.

The salient and significant feature of this table is the proof it affords that each car of those in commission averages the movement of one ton 367 miles per day. This means an average load of 14 tons per car. It would take at least three English or European freight cars to average such a load.

SAFETY APPLIANCES.

Of all the locomotives and cars in railway service in 1908, aggregating 2,302,055, less than 4% were not fitted with train brakes, and less than three quarters of 1% were unprovided with automatic couplers.

BLOCK SIGNALS.

While the gain in mileage protected by some form of block signals in 1909 is only slightly more than half the increase in 1907, it shows a healthy revival of this most important constructive work. At the close of the last calendar year, according to the *Railroad Age-Gazette*, the mileage on which some system of block signals had been installed was as follows:

System	Single Track	Two or More Tracks	Total 1909	Total 1908
Automatic block signals (miles)	6,436	7,983	14,419	11,932
Non-automatic block signals (miles)	40,323	8,593	48,916	48,777
Total miles	46,759	16,576	63,335	60,709

Miles of line operated by the companies, 1909..... 158,938

The second annual report of the government Block Signal and Train Control Board shows that little advance has been made in the search after the perfect system of automatic mechanical operation. Since the organization of the board in 1907 no less than 835 plans and descriptions of inventions designed to enhance the safety of railway operation have been submitted for its consideration. Of these 184 were examined and reported upon in 1908 and 12 were found worthy of further investigation. During the past year 327 others have been reviewed with a net result that again 12 have been found to possess enough merit to warrant the Board in conducting further tests. It finds that the vast majority of the proposed devices are unsound either in principle or design.

With regard to some form of automatic stop, the Board says that it is not yet prepared to make a definite and positive recommendation, but it thinks it reasonable to expect that several forms of automatic train controlling devices will be found available for use. In this connection it very sensibly concludes:

"It is not to be expected that trials or tests conducted by the government will, independently of extended use by railways, result in the production of devices or systems fully developed to meet all the exacting conditions of railway operation."

III

EMPLOYES AND THEIR COMPENSATION

NUMBER 1,524,400

COMPENSATION \$1,008,270,000

The 368 railway companies reporting to this Bureau had 1,463,429 persons in their employ June 30, 1909, and their pay roll for the twelve months to that date amounted to \$973,172,497. Experience has shown that these roads employ over 96% of the labor and pay 97% of the compensation earned by railway employes. From which it appears that the employes of all the railways in 1909 numbered 1,524,400, whose compensation for that year was approximately \$1,003,270,000. This would show an increase of 66,756 men employed and a decrease of \$48,362,225 in compensation—a discrepancy accounted for by the fact that the pay roll in June, 1908, was numerically at low tide while the aggregate compensation was swelled by the large pay rolls of the first six months of the fiscal year. The conditions were nearly reversed in 1909, for the pay roll was at the ebb during the first half of the year whereas the number on it did not begin to show the demands of increasing traffic until the very close of the fiscal year.

These statistics would be more enlightening if the number of employes was determined by the average from the monthly pay rolls throughout the year and not as at present "from the pay rolls on June 30." The discrepancies noted are liable to increase if the Commission succeeds in getting the permission of Congress to substitute December 31st for June 30th as the end of its statistical year. Under the present practice, the summary which follows reflects the improvement of business in the increase of employes, while their aggregate compensation continues to show the effect of the depression that prevailed throughout the greater part of the year. When, however, that compensation comes to be divided by the "Aggregate number of days worked by all employes" during the year, the daily average which results is found to be within a fraction of a cent the same as for the preceding year.

The aggregate number of days worked by the employes of the roads reporting to this Bureau was 434,328,026 days in 1909 against 453,002,228 for the preceding year.

The first summary under this title gives the number, compensation and average pay of the several classes of employes of the roads reporting for the year 1909, together with the aggregates as reported to the Interstate Commerce Commission for the preceding years:

**SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF
PAY BY CLASSES IN 1909 AND AGGREGATES FROM 1889 TO 1909.**

Class 1909 (221,132 Miles Represented)	Number	Per 100 Miles of Line	Compensation	Average Pay per Day	Per Cent of Gross Receipts
General officers.....	3,312	1.6	\$15,484,008	14.82	0.6
Other officers.....	7,415	3.3	16,847,754	6.53	0.7
General office clerks.....	67,222	30	51,945,231	2.31	2.2
Station agents.....	34,765	15	24,944,100	2.10	1.0
Other station men.....	135,056	61	78,289,039	1.81	3.3
Enginemen.....	55,747	25	77,762,158	4.46	3.3
Firemen.....	58,927	27	47,591,953	2.67	2.0
Conductors.....	42,325	19	50,269,581	3.76	2.1
Other trainmen.....	112,398	51	88,751,753	2.60	3.7
Machinists.....	47,629	22	41,381,054	2.98	1.7
Carpenters.....	59,477	27	42,954,993	2.43	1.8
Other shopmen.....	192,784	87	118,891,679	2.13	5.0
Section foremen.....	39,953	18	26,377,380	1.96	1.2
Other trackmen.....	308,369	140	107,734,419	1.38	4.5
Switch tenders, crossing tenders and watchmen.....	44,155	20	26,019,105	1.78	1.1
Telegraph operators and dis- patchers.....	38,656	17	29,655,916	2.30	1.3
Employees, account floating equipment.....	8,632	4	6,537,196	2.32	0.3
All other employees and labor- ers.....	206,607	93	121,735,178	1.98	5.2
Total (94.4% mileage represented).....	1,463,429	661	\$ 973,172,497	2.24	41.00
1908 Official figures.....	1,458,244	632	\$1,051,632,225	(b) 2.25	43.38
1907.....	1,672,074	735	1,072,386,427	2.20	41.42
1906.....	1,521,355	684	(a) 930,801,653	2.09	40.02
1905.....	1,382,196	637	839,944,680	2.07	40.34
1904.....	1,296,121	611	817,598,810	No data	41.36
1903.....	1,312,537	639	775,321,415	No data	40.78
1902.....	1,189,315	594	676,028,592	No data	39.28
1901.....	1,071,169	548	610,713,701	No data	38.39
1900.....	1,017,653	529	577,264,841	No data	38.82
1899.....	928,924	495	522,967,896	No data	39.81
1898.....	874,558	474	495,055,618	No data	39.70
1897.....	823,476	449	465,601,581	No data	41.50
1896.....	826,620	454	468,824,531	No data	40.77
1895.....	785,034	441	445,508,261	No data	41.44
1894.....	779,608	444	No data	No data	.....
1893.....	873,602	515	No data	No data	.....
1892.....	821,415	506	No data	No data	.....
1891.....	784,285	486	No data	No data	.....
1890.....	749,301	479	No data	No data	.....
1889.....	704,743	459	No data	No data	.....

(a) Includes \$30,000,000 estimate pay-roll of Southern Pacific, whose records were destroyed in the San Francisco disaster.

(b) Bureau computations.

This table brings out clearly the effect of the depression of 1908 on railway labor. While there was a decrease in numbers employed in 1908 of 213,830 or nearly 13%, co-incident with a proportionate decrease in gross revenues, the reduction in compensation amounted to less than 2%. This anomaly was due to the fact that the increased scale of pay adopted in the winter of 1906-07 was only effective during six months of the fiscal year 1907, whereas it was in full operation throughout 1908, as it still is, with demands, negotiations and arbitrations regarding wages all tending upward.

UNREMUNERATIVE EXPENDITURES.

Last year attention was called to the unremunerative burdens imposed on the railways by the multiplying demands of legislatures and commissions for reports on every conceivable feature of their multifarious affairs. This year with the compensation of every other class showing the effects of the enforced retrenchments of the period, that of the several classes especially affected by these requirements and the enactments relating to the hours and conditions of employment continue to be the only ones marked by advances over the record figures of 1907, as appears from the following comparison:

COMPENSATION OF CLASSES ESPECIALLY AFFECTED BY MULTIPLYING DEMANDS OF COMMISSIONS AND LEGISLATURES IN 1907 AND 1909.

Class	1907 227,455 Miles Represented	1909 221,131 Miles Represented
Other officers.....	\$15,012,226	\$16,847,751
General office clerks.....	48,310,123	51,915,231
Station agents.....	24,831,036	24,944,100
Telegraph operators and dispatchers.....	29,053,251	29,655,916
Employees, account floating equipment.....	6,035,415	6,537,193
Total.....	\$123,277,081	\$129,930,197
Add 4% for unreported mileage, 1909.....		5,197,207
Total.....		\$135,127,401
Increase over 1907.....		11,850,323

Moreover, had the aggregate compensation of these five classes followed the general trend of all other railway compensation, the expenditure on this account would have been at least \$22,000,000 less than it was. This sum represents only a part of what the railways have to pay for a system of accounting and reporting out of all proportion to its published results. The public has no idea of

the onerous and unprofitable burdens imposed on the railways by the impractical theory of administering railways through the medium of arbitrary and theoretical accounts.

AVERAGE DAILY COMPENSATION 1909-1892.

Where the data in regard to total compensation of railway employes has been kept since 1895, that of their daily average pay runs back to 1892, thus covering the period of the last preceding severe panic. Under instructions of the Official Statistician, these averages are computed by dividing the compensation paid by the actual days worked throughout the year in the several classes as nearly as it has been practicable to do so. Although the formula is more or less arbitrary, the system has been continuous and so the results are reliable for comparative purposes.

In the statement following, figures for 1895, 1896 and 1905 have been omitted to economize space, and because they present no significant variations from the years preceding them.

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF RAILWAY EMPLOYES FOR THE YEARS ENDING JUNE 30, 1908 TO 1892.

Class	1909*	1908*	1907	1906	1904	1903	1902	1901	1900	1899	1898	1897	1894	1893	1892
General officers.....	14.82	15.18	11.93	11.81	11.61	11.27	11.17	10.97	10.45	10.03	9.73	9.54	9.71	7.84	7.62
Other officers.....	6.53	6.42	5.99	5.82	6.07	5.76	5.60	5.56	5.22	5.18	5.21	5.12	5.75	.....	.....
General office clerks...	2.31	2.35	2.30	2.24	2.22	2.21	2.18	2.19	2.19	2.20	2.25	2.18	2.34	2.23	2.20
Station agents.....	2.10	2.10	2.05	1.94	1.93	1.87	1.80	1.77	1.75	1.74	1.73	1.73	1.75	1.83	1.81
Other station men.....	1.81	1.82	1.78	1.69	1.69	1.64	1.61	1.59	1.60	1.60	1.61	1.62	1.63	1.65	1.68
Enginemen.....	4.46	4.46	4.30	4.12	4.10	4.01	3.84	3.78	3.75	3.72	3.72	3.55	3.61	3.66	3.68
Firemen.....	2.67	2.65	2.54	2.42	2.35	2.28	2.20	2.16	2.14	2.10	2.09	2.05	2.03	2.04	2.07
Conductors.....	3.76	3.83	3.69	3.51	3.50	3.38	3.21	3.17	3.17	3.13	3.13	3.07	3.04	3.08	3.07
Other trainmen.....	2.60	2.64	2.54	2.35	2.27	2.17	2.04	2.00	1.96	1.94	1.95	1.90	1.89	1.91	1.89
Machinists.....	2.98	2.95	2.87	2.69	2.61	2.50	2.36	2.32	2.30	2.29	2.28	2.23	2.21	2.33	2.29
Carpenters.....	2.43	2.40	2.40	2.28	2.26	2.19	2.08	2.06	2.04	2.03	2.02	2.01	2.02	2.11	2.08
Other shopmen.....	2.13	2.13	2.06	1.92	1.91	1.86	1.78	1.75	1.73	1.72	1.70	1.71	1.69	1.75	1.71
Section foremen.....	1.96	1.96	1.90	1.80	1.78	1.78	1.72	1.71	1.68	1.68	1.69	1.70	1.71	1.75	1.76
Other trackmen.....	1.38	1.45	1.46	1.36	1.33	1.31	1.25	1.23	1.22	1.18	1.16	1.16	1.18	1.22	1.22
Switchmen, flagmen and watchmen.....	1.78	1.82	1.87	1.80	1.77	1.76	1.77	1.74	1.80	1.77	1.74	1.72	1.75	1.80	1.78
Telegraph operators and dispatchers....	2.30	2.30	2.26	2.13	2.15	2.08	2.01	1.98	1.96	1.93	1.92	1.90	1.93	1.97	1.93
Employees account floating equipment..	2.32	2.37	2.27	2.10	2.17	2.11	2.00	1.97	1.92	1.89	1.89	1.86	1.97	1.96	2.07
All other employes and laborers.....	1.98	1.98	1.92	1.83	1.82	1.77	1.71	1.69	1.71	1.68	1.67	1.64	1.65	1.70	1.67

*Averages for 1909 and 1908 are calculated from the returns to the Bureau of days worked and compensation of the several classes of roads representing 97% of the traffic.

The average pay of general officers for 1909 and 1908 in this summary is out of proportion, for the reason that the returns to the Bureau cover only 60% of the class numerically and include all the larger systems. Before 1894, this class included "Other officers," so the returns for 1893 and 1892 are not comparable with those for this class in subsequent years.

Comparing the average daily compensation of the four great classes most intimately associated in the public mind with railway operations in 1899 and 1909, it appears that during the decade the average wages of enginemen increased approximately 20%; of firemen 27%; of conductors 20%; and of other trainmen, including switchmen, brakemen and baggagemen—the most numerous body—34%.

An estimate based on the number employed and their aggregate compensation in 1899, allowing 310 working days to the year, would place the increase for all employees during the decade at 23%.

The relation of the compensation of railway employees to the gross earnings of the railways, which furnish the fund from which they are paid, and also to the sum of the expenses incurred in producing those earnings for the past ten years, is shown in the next summary, in conjunction with the operating ratio:

**SUMMARY SHOWING PROPORTION OF COMPENSATION OF EMPLOYEES
TO GROSS EARNINGS AND OPERATING EXPENSES, AND OF
OPERATING RATIO TEN YEARS, 1899 TO 1909.**

	Ratio Compensation of Labor to Gross Earnings	Ratio Compensation of Labor to Operating Expenses	Ratio of Operating Expenses to Gross Earnings
1909.....	41.00%	62.06%	66.12%
1908.....	43.38%	62.33%	69.67%
1907.....	41.42%	61.41%	67.53%
1906.....	40.02%	60.79%	66.08%
1905.....	40.34%	60.40%	66.78%
1904.....	41.36%	61.07%	67.79%
1903.....	40.78%	61.65%	66.16%
1902.....	39.28%	60.58%	64.66%
1901.....	38.39%	59.27%	64.86%
1900.....	38.82%	60.04%	64.65%
1899.....	39.81%	61.04%	65.24%
Increase 1899 to 1909..	3.00%	1.65%	1.35%

The significance of this statement is that in spite of all the labor saving devices and economies of operation—reduced grades, modified curves and more efficient equipment—adopted by the railways during the past decade, the proportionate cost of labor to earnings

and to expenses has increased. It reached an abnormally high ratio in 1908 because of the unprecedented recession in revenues during the second half of the year. The fact that it has been above 40% persistently since 1902 proves that labor continues to receive its full proportion of the receipts of American railways.

PAY OF EMPLOYEES ON BRITISH RAILWAYS.

Although the statistics of British railways are singularly barren of details respecting the compensation of British railway "servants," as they are termed, the reports of Boards of Conciliation afford data as to the rates of pay of several classes as follows:

SCALE OF WAGES OF DRIVERS AND FIREMEN ON NORTH BRITISH RAILWAY, 1909.

	Rate per Day of 12 Hours	
	Drivers	Firemen
Passenger engines, main line, long road	\$1.56	\$0.88
Passenger engines running into chief terminal station	1.44	.84
Passenger engines, branch lines	1.32	.80
Goods engines, main line, long road, trip men	1.44	.88
Goods engines, main line, other than long road	1.32	.84
Goods and mineral engines running into depots and terminal stations	1.20	.80
Goods and mineral engines working branch lines and collieries	1.14	.76
Mineral pilot, pilot and shunting engines	1.04	.72

In his award in the case of the North Eastern Railway, Sir James Woodhouse fixed the following scales:

Firemen.—First year, 84 cents per day; 2d year, 90 cents; 3d year, 96 cents; 4th and 5th years, \$1.02; 6th year, \$1.08; 7th year, \$1.14; 8th year, and subsequent years, \$1.20. Firemen to pass for drivers during the 8th year.

Cleaners.—Age 16 to 17 years, \$2.40 per week; 17 to 18 years, \$2.64; 18 to 19 years, \$3.12; 19 to 20 years, \$3.60; 20 to 21 years, \$4.08; and an advance of 24 cents per week for each subsequent year up to a maximum of \$4.80 per week.

"That the wages of all goods and mineral guards be increased as follows:

"(a) The wages of those who have been in receipt of \$7.20 (the maximum of the existing scale) for not less than two years shall be increased to \$7.44 per week.

"(b) The wages of those who have been in receipt of the said maximum for not less than five years shall be increased to \$7.68 per week.

"The bonus for working with large engines on freight trains discontinued when any guard becomes entitled to the maximum wages of \$7.68 per week."

Men working in the London district get from 6 to 12 cents more per day than those in outside districts.

The award in the case of the Great Northern made an addition of 24 cents to the weekly scale of the following grades: Signalmen \$1.32, \$4.56, \$4.80 and \$5.04; passenger guards and brakemen \$5.28 up to \$6.00; goods guards and brakemen \$5.04 up to \$6.24; ticket collectors \$5.04 up to \$5.52; horse shunters \$4.56 up to \$5.04; parcels porters \$4.32 to \$5.04; carriage cleaners \$4.08 to \$4.32; plate layers, second men and under men \$4.32 and less up to \$5.04; ballast train guards, flagmen and greasers rates less than \$5.04 per week.

An additional allowance of 24 cents per week is made to men stationed in the London district.

From these figures a fair idea is gained of the average pay of British railway labor. They support the statement that there are over 100,000 railway men in the United Kingdom working for less than one pound (\$4.87) a week. The total compensation paid British railway employes in 1908 was \$156,248,000 against \$162,440,000 for the preceding year. But whether the decrease was due to a reduction in pay or in numbers employed cannot be told, as there has been no census of railway "servants" since 1907. The average pay may be safely approximated at \$260 per year per man, boy and porter, who two years ago numbered 621,341.

In 1907, Special Agent Ames, of the Interstate Commerce Commission, reported wages on the railways of the United Kingdom as follows:

Enginemen.....	\$9.32 per week
Firemen.....	5.76 " "
Conductors.....	6.26 " "
Brakemen.....	6.44 " "
Shunters.....	5.80 " "
Examiners.....	5.80 " "
Signalmen.....	5.66 " "
Trackmen.....	5.58 " "

PAY OF RAILWAY EMPLOYEES IN OTHER COUNTRIES.

The contrast between the wages of American and European railway employes is emphasized by those paid on the continent. The official statistics of the empire show an increase of 5% in the average yearly compensation of German railway employes in 1908.

Their number and pay for that year to December 31st in the four main classes into which they are divided were as follows:

**NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES BY PRINCIPAL
DIVISIONS FOR THE YEAR ENDING DECEMBER 31, 1908.**

Division	Employees Number	Compensation (Total)	Average per Year	Increase over 1907
General administration.....	31,996	\$ 25,167,240	\$787	\$64
Maintenance and guarding road.....	177,633	42,891,753	241	5
Station service and train crews.....	302,343	116,219,657	384	24
Switching crews and shops.....	187,183	75,328,084	402	18
Total.....	699,155	\$259,606,734	\$371	\$19
Increase over 1907.....	3,598	14,216,875	.....	.....

Combined with a falling off in revenues and an increase in the cost of materials this increase in the compensation of employees had the effect of raising the operating ratio of German railways from 69.01 in 1907 to 73.56 in 1908. It also increased the proportion of wages to gross earnings from 37.25 to 40.1% and had the effect of reducing the net revenues from 5.60% to 4.51% on the cost of construction.

How railway labor fares under government ownership in a republic as compared with its pay in an empire may be judged from a comparison of the following statement as to the number and pay of the railways of Switzerland with the like classes in the preceding table for Germany.

**NUMBER AND PAY OF SWISS RAILWAY EMPLOYEES BY PRINCIPAL
DIVISIONS IN 1907.**

Division	Employees Number	Compensation (Total)	Average per Year
General administration.....	1,631	\$ 780,715	\$478
Maintenance and inspection of way.....	10,308	1,459,977	142
Transportation and train service.....	17,815	6,829,426	383
Porters and laborers.....	12,219	3,209,810	262
Total.....	41,973	\$12,279,928	\$292

The wages paid the employees of Swiss railways in 1907 amounted to only 31.9 per cent. of the gross earnings, and yet they added enough to the cost of operation to help increase the telltale ratio of expenses to revenues from 64.99 in 1906 to 67.29 in 1907. The result was increased operating expenses per mile and a decrease in

the amount available for interest in dividends from 3.26% in 1906 to 3.23% in 1907.

As the Swiss republic has to pay 3½% on government loans its investment in railways does not appear to be a very profitable one.

EMPLOYEES OF FRENCH RAILWAYS.

The employes of the railways of France are divided into the following classes:

General administration.....	3,119
Transportation and traffic.....	128,823
Traction and material.....	80,732
Way and structures.....	81,897
Auxiliaries.....	82,809
Female employes.....	29,178
Total.....	406,558

The official statistics only give the compensation of employes in the division of traction and material, where the 80,732 men employed get an average of \$187 per year.

On the state railways of Belgium, firemen receive from \$15.20 to \$22.80 per month, the higher wage only after 15 years' service; enginemen begin at \$22.50 per month and at the end of 24 years' service work up to \$38.00 per month; conductors earn from \$15.97 per month up to a maximum of \$34.70; brakemen, beginning as shunters (switchmen) at 45 cents a day, when promoted get a minimum of \$17.10 per month, from which they are slowly advanced to a maximum of \$22.00. The average railway worker in Belgium gets 2.22 francs (43 cents) a day.

Whole classes of American railway employes get more in a month than Belgian railway employes average in a year.

THE COST OF LIVING.

What and how great the virtue and the art,
To live on little with a cheerful heart.—Pope.

Not because it has any legitimate place in fixing the standard of railway wages, which should be relative to the part capacity, intelligence, industry, loyalty and experience play in railway service, but because in recent years the steady increase in the cost of living has been made the fulcrum on which every lever to advance wages works, is it proper to refer to the subject in this report.

Now there is nothing in the whole wilderness of economics so utterly illusive and misleading as this same cost of living. It is as incapable of statistical expression as the airy imaginings of a dream and yet it broods over the domestic happiness of nations

with all the disquieting effects of a nightmare—and like every nightmare it comes from eating too much and wanting to eat more.

In economics, beyond the barest subsistence, the cost of living is not ruled by necessity but by individual choice. Each person and family settles it along the lines of abstinence or indulgence. It ranges from the “dinner of herbs where love is” and the virtues of self-denial are nourished, to the feasts of Lucullus and Pompeian profligacy in whose indulgence whole peoples have perished.

In every discussion of the subject first consideration is given to the price of food. This amounts to measuring the cost of living with an elastic string. The proportion of the cost of food to the cost of living varies in every land, in every occupation and in every household. It amounts to less than 40% in an average American family, but each family fixes it for itself. Following certain well recognized economic laws the percentages for subsistence increases as the income decreases. For instance, in France families with an income of under \$4.80 per week spend 63% of it for food alone, whereas those with \$9.60 a week spend 53%. In England, families averaging \$5.12 a week spend 67% on food, while those of \$9.60 spend 57% or less. In Germany, a similar inquiry showed that families with an average income of \$4.23 per week spent 68.7% on food (excluding beer), or 69.5% (with beer); whereas families with an income of \$9.60 per week spent less than 57% on food “excluding beer.”

The exhaustive investigation made by Commissioner Carroll D. Wright when head of the Bureau of Labor in 1903 anticipated for the United States these results of more recent European inquiries, as appears from the following table showing the per cent of total expenditure made for various purposes in normal families according to classified incomes:

PER CENT OF EXPENDITURE FOR VARIOUS PURPOSES IN 11,156
NORMAL FAMILIES, BY CLASSIFIED INCOMES, 1901.

Classified income	Rent	Fuel	Lighting	Food	Clothing	Sundries
Under \$200.....	16.93	6.69	1.27	50.85	8.68	15.58
\$200 or under \$300.....	18.02	6.09	1.13	47.33	8.66	18.77
\$300 or under \$400.....	18.69	5.97	1.14	48.09	10.02	16.09
\$400 or under \$500.....	18.57	5.54	1.12	46.88	11.39	16.50
\$500 or under \$600.....	18.43	5.09	1.12	46.16	11.98	17.22
\$600 or under \$700.....	18.48	4.65	1.12	43.48	12.88	19.39
\$700 or under \$800.....	18.17	4.14	1.12	41.44	13.50	21.63
\$800 or under \$900.....	17.07	3.87	1.10	41.37	13.57	23.02
\$900 or under \$1000.....	17.58	3.85	1.11	39.90	14.35	23.21
\$1000 or under \$1100.....	17.53	3.77	1.16	38.79	15.06	23.69
\$1100 or under \$1200.....	16.59	3.63	1.08	37.68	14.89	26.13
\$1200 or over.....	17.40	3.85	1.18	36.45	15.72	25.40
All classes.....	18.12	4.57	1.12	43.13	12.95	20.11

While it is scarcely believable that many American families with incomes under \$200 spent less than \$100 a year on food—the European percentage in such cases being more credible—there is no reason to question the general economic law reflected in this table, that “the proportion of income spent on food diminishes as the income increases.” But it is governed more by individual tendencies, character and taste than by any rule or principle. Each family works out the problem on its own account.

According to the evidence presented at recent arbitration hearings in this city, American switchmen, as a body, belong in the classes whose family expenditures are \$1,000 or over. Irrespective of the incomes of other members of their families, the arbitrators found “that the actual monthly earnings of switchmen in the Chicago district, for those who worked full time runs from about \$35 to \$100 per month.” This means over \$1,000 yearly compensation. Therefore they are in the class which spends less than 39% of its income on food.

The average income for all railway employes engaged in train service, that is, enginemen, firemen, conductors and other trainmen, is probably above the highest figure in the above table and therefore the proportion of their income spent for food would be approximately 36%.

But accepting 40% as approximately the proportion of the pay of all railway employes spent on food, it follows that it takes only two-fifths of one per cent increase in wages to take care of an increase of one per cent in the price of food.

With this in mind it becomes instructive to follow the retail prices of the various articles of food as selected by Mr. Wright in his inquiry into the cost of living in 1901 and adopted by the Bureau of Labor in subsequent Bulletins. These for thirty articles of food for the eighteen years 1890 to 1907, as given in Bulletin No. 77 of the Bureau of Labor, and for the two years 1908-1909 as computed from Bradstreet's index and other sources of commodity prices, are given in the following statement relatively to the average price for 1890 to 1899=100:

**RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN
THE UNITED STATES, 1890 TO 1909.
(Average price for 1890-1899=100.0.)**

Year	Apples, Evapo- rated	Beans, Dry	Beef, Fresh, Roasts	Beef, Fresh, Steaks	Beef, Salt	Bread, Wheat	Butter	Cheese	Chick- ens (year or more old), dressed	Coffee
1890.....	109.0	103.3	99.5	98.8	97.5	100.3	99.2	98.8	101.3	105.4
1891.....	110.3	106.2	100.0	99.4	98.3	100.3	106.4	100.3	104.0	105.2
1892.....	99.3	102.4	99.6	99.3	99.5	100.3	106.8	101.5	103.8	103.8
1893.....	107.0	105.0	99.0	99.6	100.3	100.1	109.9	101.8	104.2	104.8
1894.....	105.8	102.8	98.3	98.2	98.9	99.9	101.7	101.6	98.6	103.3
1895.....	97.4	100.5	98.6	99.1	99.6	99.7	97.0	99.2	98.4	101.7
1896.....	88.6	92.7	99.1	99.5	99.8	99.9	92.7	97.9	97.1	99.6
1897.....	87.8	91.5	100.3	100.2	100.9	100.0	93.1	99.0	94.0	94.6
1898.....	95.4	95.9	101.7	102.0	102.1	99.8	95.1	97.5	96.8	91.1
1899.....	99.5	99.7	103.7	103.9	103.2	99.6	97.7	102.4	101.8	90.5
1900.....	95.2	110.0	106.5	106.4	103.7	99.7	101.4	103.9	100.8	91.1
1901.....	96.8	113.9	110.7	111.0	106.1	99.4	103.2	103.3	103.0	90.7
1902.....	104.4	116.8	118.6	118.5	116.0	99.4	111.5	107.3	113.2	89.6
1903.....	100.8	118.1	113.1	112.9	108.8	100.2	110.8	109.4	113.5	89.3
1904.....	99.2	116.8	112.8	113.4	108.3	103.9	109.0	107.4	120.7	91.8
1905.....	106.0	116.3	112.2	112.9	107.9	104.5	112.7	110.9	123.6	93.6
1906.....	115.6	115.2	115.7	116.5	110.8	102.3	118.2	115.5	129.1	94.7
1907.....	124.6	118.8	119.1	120.6	114.1	104.5	127.6	123.2	131.4	95.0
1908.....	126.4	138.9	126.2	131.5	116.4	124.5	123.5	121.3	128.6	94.7
1909.....	128.6	141.2	132.6	134.1	128.2	124.5	134.8	142.0	150.2	108.6

Year	Corn Meal	Eggs	Fish, Fresh	Fish, Salt	Flour, Wheat	Lard	Milk, Fresh, un- skim- med	Molas- ses	Mut- ton	Pork, Fresh
1890.....	100.0	100.6	99.3	100.7	109.7	98.2	100.5	104.7	100.7	97.0
1891.....	109.7	106.9	99.6	101.7	112.5	99.8	100.5	101.7	100.6	98.7
1892.....	105.2	106.8	100.1	102.2	105.1	103.6	100.6	101.2	101.0	100.5
1893.....	103.1	108.1	100.1	103.4	96.1	117.9	100.4	100.6	99.9	107.0
1894.....	102.2	96.3	100.4	101.5	88.7	106.9	100.2	100.3	97.8	101.8
1895.....	100.8	99.3	99.8	98.9	89.0	100.1	100.0	99.0	98.7	99.7
1896.....	95.0	92.8	100.2	97.5	92.7	92.5	99.9	98.7	98.7	97.4
1897.....	93.7	91.4	99.8	95.2	104.3	89.8	99.7	97.7	99.6	97.6
1898.....	95.0	96.2	100.5	98.8	107.4	93.9	99.4	97.9	100.4	98.6
1899.....	95.1	101.1	100.2	100.2	94.6	97.1	98.9	98.2	102.6	101.7
1900.....	97.4	99.9	100.4	99.1	94.3	104.4	99.9	102.2	105.6	107.7
1901.....	107.1	105.7	101.4	100.9	94.4	118.1	101.1	101.3	109.0	117.9
1902.....	118.8	119.1	105.0	102.8	94.9	134.3	103.3	102.1	114.7	128.3
1903.....	120.7	125.3	107.3	108.4	101.2	126.7	105.8	103.8	112.6	127.0
1904.....	121.5	130.9	107.9	111.7	119.9	117.3	106.3	104.0	114.1	124.0
1905.....	122.2	131.6	109.9	113.8	119.9	116.6	107.0	104.4	117.8	126.6
1906.....	123.2	134.2	116.2	116.8	180.1	128.0	108.9	105.3	124.1	137.7
1907.....	131.6	137.7	120.6	121.6	117.7	134.2	116.8	107.7	130.1	142.5
1908.....	154.0	140.2	116.2	118.4	140.0	132.1	115.4	102.2	126.4	141.6
1909.....	160	142.2	120.4	122.6	154.4	153.8	141.6	106.4	134.8	168.2

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN
THE UNITED STATES, 1890 TO 1909—Continued.

(Average price for 1890-1899 = 100.0.)

Year	Pork, Salt, Bacon	Pork, Salt, dry or pickled	Pork, Salt, Ham	Pota- toes, Irish	Prunes	Rice	Sugar	Tea	Veal	Vinegar
1890.....	95.8	95.3	98.7	109.3	116.8	101.3	118.6	100.0	98.8	102.9
1891.....	96.6	98.9	99.3	116.6	116.5	102.5	102.7	100.4	99.6	105.5
1892.....	99.1	100.5	101.9	95.7	113.5	101.3	96.2	100.2	100.0	102.7
1893.....	109.0	108.7	109.3	112.3	115.6	98.4	101.5	100.1	100.0	99.5
1894.....	103.6	103.4	101.9	102.6	100.9	99.0	93.8	98.7	98.7	99.8
1895.....	99.4	99.2	98.8	91.8	94.2	98.8	91.8	98.5	98.5	98.9
1896.....	96.7	95.5	97.6	77.0	86.8	96.7	96.6	98.8	99.5	97.2
1897.....	97.4	97.3	98.2	93.0	84.3	97.9	95.7	98.5	99.9	97.4
1898.....	100.2	99.1	95.1	105.4	86.3	101.7	101.3	100.7	101.2	97.9
1899.....	102.9	101.8	99.2	96.1	85.1	102.4	101.7	104.4	103.7	98.3
1900.....	109.7	107.7	105.3	93.5	83.0	102.4	104.9	105.5	104.9	98.5
1901.....	121.0	117.5	110.2	116.8	82.6	103.5	103.0	106.7	108.8	98.9
1902.....	135.6	132.5	119.4	117.0	83.4	103.5	96.0	107.2	115.2	99.5
1903.....	139.8	129.0	121.3	114.8	80.2	103.9	96.1	106.0	114.9	99.1
1904.....	137.9	125.8	118.4	121.3	79.6	101.6	101.9	105.8	115.5	98.9
1905.....	138.8	126.0	118.5	110.2	81.4	102.6	103.9	105.7	117.7	100.3
1906.....	150.4	136.9	127.2	114.4	85.1	105.7	98.2	105.5	123.2	102.6
1907.....	157.3	141.2	130.7	120.6	88.4	108.5	99.6	105.3	125.0	104.5
1908.....	142.4	137.4	112.0	138.4	.....	105.1	100.0	108.6	124.2	112.4
1909.....	180.0	151.2	145.0	120.0	.....	103.3	105.0	109.0	130.2	113.0

No authority is claimed for the prices in these tables for the years 1908 and 1909. They merely represent the tendencies in those years, as found in official and unofficial wholesale prices of the several commodities, and there are often striking divergences between wholesale and retail prices over short periods. Eventually they follow the same course, although not always in the same proportion.

Now let us see how the average retail price of these 30 articles of food compares with the average daily pay of the four representative classes of railway employees in train service for the ten years 1899 to 1909.

Year	Average Daily Compensation				Relative Prices of Food, 1890-1899 =100
	Engine- men	Firemen	Con- ductors	Other Trainmen	
1899.....	\$3.72	\$2.10	\$3.13	\$1.94	99.6
1900.....	3.75	2.14	3.17	1.98	101.5
1901.....	3.78	2.16	3.17	2.00	105.5
1902.....	3.84	2.20	3.21	2.04	110.9
1903.....	4.01	2.28	3.38	2.17	110.9
1904.....	4.10	2.35	3.50	2.27	111.6
1905.....	4.12	2.38	3.50	2.31	112.5
1906.....	4.12	2.42	3.51	2.35	116.2
1907.....	4.30	2.54	3.69	2.54	120.7
1908.....	4.46	2.65	3.83	2.64	117.7
1909.....	4.46	2.67	3.76	2.60	127.7
Per cent. increase	19.9	27.1	20.1	34.0	28.2

Here it will be observed the percentage of increase in the average daily compensation of "Other trainmen" exceeds the relative increase in the price of food, that of firemen almost equals it, while that of enginemen and conductors is below it by approximately 8 points. But, as demonstrated in the table from the Eighteenth Annual Report of the Commissioner of Labor (1903), a smaller percentage of the income of enginemen and conductors is spent on food than of those employees receiving lower pay.

Moreover as only two-fifths of all expenditures is spent on food an increase of 20% in wages would take care of a 50% advance in the average price of food—provided the increase in wages were not attended by a corresponding increase in every other item entering into the cost of living.

And right here's the rub with any attempt to measure wages by the cost of living. Which is the egg and which is the hen, in the matter of precedence. Does the cost of living lay the income or does the income hatch the cost of living?

Economically and theoretically it is not up to the railways to solve this world old conundrum. Practically they are called on to meet every advance in the cost of living of their employees to which in twenty years they have not added a nickel, and they are denied the privilege, enjoyed by every other employer of labor, to add its increased cost to the price of their only commodity or service—transportation.

Today the advances in the scale of railway wages awarded, proposed and demanded mean an increase of from \$60,000,000 to \$75,000,000 in the annual "cost of living" of the railways. The

advance made in 1906-07 added \$120,000,000 to the pay roll of 1908. Combined, these two advances within three years mean an increase of approximately \$200,000,000 a year to the operating expenses of the railways without adding a single unit to efficiency of the labor factor in railway operation.

This is equal to an annual first charge of 5% on \$4,000,000,000! Imagine the hue and cry from the press, the immediate injunctions from Washington, the desponding wail from Wall Street, if the railways proposed to pour that much "water" into their own cost of living without getting a mile of track, a single engine, car, or coach, a cubic yard of ballast, one untreated tie or any semblance of improvement or new facility to show for the vast expenditure!

And yet the railways have their increased cost of living to meet just as the rest of us. Nothing they need and must have can be purchased at the prices of a few years back. When you mention steel rails you have named about the only railway necessity that has not advanced its cost of living in recent years, and the railways have to buy 100-pound rails where five years ago 80-pound rails sufficed, and ten years ago 70 pounds was heavy enough for the lighter cars and engines of the time.

But at the first suggestion of advancing rates to meet advancing prices of commodities the Commissions were overwhelmed with protests from shippers and the paring of freight rates down went on as the prices of the goods they carried went up.

In ten years the price of lumber advanced nearly 50%. As a cheap bulky commodity it had enjoyed a low rate in order to move it and it was moved at the expense of other commodities. When it was able to pay a little more toward the cost of getting it to market the proposal of an advance was met with indignant protests from lumber shippers and dealers and reversed thumbs by the sympathetic commissions.

The railways pay more for their lumber and other material today than they did ten years ago but they will have to fight for any advance in rates to meet this part of their cost of living. It is said to be a poor rule that will not work both ways—but the cost of living seems to have only one way of working so far as railway economics are concerned.

Just as a straw to indicate that high prices of food are the result and not the basis of high wages the following table of comparative prices in London and New York from the New York *Times* of March 27, 1910, is instructive:

COMPARATIVE RETAIL PRICES OF ARTICLES OF FOOD IN LONDON
AND NEW YORK IN MARCH, 1910.

	London. Cents.	New York. Cents.
Apples, 1 lb.....	4 to 6	10
Bread, 1 lb.....	4	5
Butter, 1 lb.....	24 to 32	30 to 35
Cheese, 1 lb.....	14 to 16	18 to 22
Cocoa, 1 lb.....	16 to 36	25 to 50
Coffee, 1 lb.....	16 to 30	20 to 50
Currants, 1 lb.....	4 to 8	8 to 12
Eggs, 12 to 16.....	25	6 to 12—25
Codfish, 1 lb.....	8 to 12	15 to 29
Fish (general), 1 lb.....	4 to 12	10 to 25
Flour, 3 lbs.....	9 to 10	12
Meats:		
Bacon, 1 lb.....	16 to 24	25 to 30
Beef, 1 lb.....	16 to 20	22 to 30
Pork, 1 lb.....	12 to 16	20 to 24
Milk, 1 pint.....	4	4 to 5
Oatmeal, 1 lb.....	4 to 6	5 to 10
Onions, 1 lb.....	2	4
Oranges, 1 doz.....	10 to 12	18 to 50
Potatoes, 1 lb.....	1 to 2	3 to 4
Prunes, 1 lb.....	8 to 12	10 to 18
Raisins, 1 lb.....	6 to 10	10 to 16
Rice, 1 lb.....	4	6
Syrup, 1 lb.....	6	10
Sugar white, 1 lb.....	6	6
Sugar, yellow, 1 lb.....	4	5
Tapioca, 1 lb.....	8	10
Tea, 1 lb.....	20 to 60	30 to 1.50
Tomatoes, 1 lb.....	8	12

The amazing feature of this statement is that the United States produces and exports to the United Kingdom enormous quantities of breadstuffs, meat and provisions, which constitute the chief articles of food in London and which are sold there at prices from 20% to 25% lower than in New York. Clearly it is the high scale of wages that fosters the high cost of living in the United States and there can be little question but it breeds the high wages it feeds on.

It is humanly certain, though economically unsound, that wages will continue to advance with the cost of living and will not recede proportionately as prices of food fall. But both will decline together when for any considerable period there is a surplus of efficient labor for the requirements of American industry. Even railway labor in the most stable of all employments yielded to this influence in 1893 and 1894; and the prices of food receded to the low mark in the following years 1895, 1896 and 1897. Not until wages took their upward turn in 1898 did the cost of food begin to show above the index average of 1890-1899.

IV

CAPITALIZATION

According to the Twenty-third Annual Report of the Interstate Commerce Commission the amount of railway capital, including stocks and bonds "outstanding in the hands of the public on June 30, 1908, was \$12,840,091,462, which, if assigned on a mileage basis, shows a capitalization of \$57,230 per mile of line."

In the face of all the fustian about over-capitalization of American railways, this is a most remarkable admission, not only of their moderate, but of their decreasing capitalization per mile.

In its report on the Intercorporate Relationships of Railways, dated March 10, 1908, the Commission found that as the result of its investigation the figure for railway capital outstanding in the hands of the public, "Measuring the claim of railway securities on railway revenues," reduced the amount "from \$67,936 per mile of line (1906) to \$58,050 per mile of line."

Of course there was never any justification for using the larger sum as a true measure of railway capitalization, for it was known to contain at least 15% duplicated capital.

In its Statistics of Railways for the year ending June 30, 1907, the Commission gave the net amount of railway capital outstanding in the hands of the public at that date, "assigned on a mileage basis as \$58,298 per mile of line," or \$1,068 more than the figure reported for 1908.

As the computation for 1908 was made on a basis of 224,363 miles of line, this would indicate a shrinkage of no less than \$239,616,480 in the par value of railway capital. It is needless to say there was no such shrinkage.

NET CAPITALIZATION IN 1909.

Following the earlier judgment of the Official Statistician, this Bureau seeks to arrive at a fair approximation of the capitalization of the railways of the United States through the reports of operating roads and the capitalization of the rentals paid for leased roads. This, in the more recent language of the Statistician, furnishes the only capitalization that "measures the claim of railway securities on railway revenues."

Applied to the returns received by this Bureau from 221,132 miles of operated line, this formula yields the following result for the year ending June 30, 1909:

**SUMMARY SHOWING CAPITALIZATION OF 368 COMPANIES OPERATING
221,132 MILES OF LINE FOR THE YEAR ENDING JUNE 30, 1909.**

	Capitalization 1909 (182,046 Miles Owned)	
Capital stock.....	\$6,199,919,551	
Funded debt.....	8,015,841,805	
Receivers' certificates.....	20,497,447	
Rental of 39,086 miles, \$120,784,982, capitalized at 5%.....		\$14,236,258,803 2,415,699,640
Total.....		\$16,651,958,443
Deduct:*		
Railway stocks owned (actual value).....	\$1,889,157,214	
Other stocks owned (actual value).....	206,461,423	
Railway bonds owned (actual value).....	1,054,095,905	
Other bonds owned (actual value).....	140,282,728	
		3,289,997,270
Net capitalization, 1909.....		\$13,361,961,173
Net capitalization per mile operated.....		60,425

*The par value of these stocks and bonds owned is given as \$4,739,231,832.

An estimate of \$25,000 per mile for the 11,870 miles of line not reporting to this Bureau would add \$296,750,000 to the above total. From this should be deducted \$150,000,000 for the sum assigned by the Official Statistician "to other properties," and we arrive at the following close approximation of the true measure of the capital employed in the transportation industry of the United States:

Net capitalization, 233,002 miles operated line, 1909.....	\$13,508,711,173
Net capitalization per mile of line.....	57,962
Net capitalization per mile of track.....	39,730

In computing the average capital per mile last given, no allowance has been made for the 8,927 miles operated under trackage rights for the sufficient reason that the rental paid therefor is represented in the total capitalization just as fully as if so much capital had been expended in the construction of that many miles of line.

It is worthy of note that the net capitalization thus arrived at through a straightforward analysis of the returns of the operating companies is in substantial agreement with the Commission's report on the Intercorporate Relationship of Railways in 1908. The construction of 11,000 miles of line since 1906 would undoubtedly account for the difference between \$58,050 and \$57,962 per mile of line.

SUMMARY SHOWING NET CAPITALIZATION OF THE RAILWAYS OF THE UNITED STATES, 1909-1904.

Year	Net Capital	Per Mile of Line
1909.....	\$13,508,711,173	\$57,962
1908.....	13,007,012,563	58,664
1907.....	13,064,279,303	59,600
1906.....	12,628,000,000	57,966
1905.....	11,167,105,992	53,328
1904.....	10,711,794,278	52,099

Owing to the intercorporate ownership of stocks and bonds and the consequent intercorporate payments of interest and dividends, it is no easy matter to make an entirely satisfactory estimate of the return paid to capital out of the purely transportation revenues of the railways. But the persistent reiteration by the Official Statistician of the fictitious aggregate of all the dividends paid by operating and non-operating companies, covering in 1908, by his own admission, \$3,927,453,365 duplicated capital, justifies the attempt.

The operating income of the roads reporting to this Bureau for the year 1909 is arrived at thus:

Gross earnings (221,132 miles operated).....	\$2,375,141,766
Operating expenses.....	1,568,008,389
Net earnings from operation.....	\$ 807,133,377
Less taxes.....	82,650,214
Net operating income.....	\$ 724,483,163

This \$724,483,163 is the balance in the hands of the 368 companies of the moneys received by them from transportation, or, as the Official Statistician now calls it, "rail operations," for the payment of interest, rent, other deductions, dividends, additions and betterments, reserves, surplus and deficits. But before proceeding to this distribution these companies received \$200,725,696 income

from other sources, principally interest and dividends on stocks and bonds owned and for rent of track, and a net balance of \$5,410,338 from outside operations. The total of these two sums, \$206,-136,034, may be arbitrarily applied first to offset the item of rent, \$120,784,982, paid for leased lines and track, and the balance in payment of interest and dividends in proportion to the value of bonds and stocks owned as above, viz.: 36% and 64%, respectively.

This enables us to make the following distribution of the net operating income of the railways reporting to this Bureau, as follows:

Net operating income, as above			\$724,483,163
Disposition of same:			
Interest on funded debt	\$324,181,521		
Less paid from "other income"	30,843,416	\$293,338,105	
Interest on current liabilities		22,546,779	
Other deductions		70,174,473	
Dividends preferred stock	50,183,739		
Dividends common stock	176,607,550		
	\$226,791,289		
Less paid from "other income"	54,832,742	171,958,547	
Dividends on other securities		769,222	
Additions and betterments charged to income		24,807,546	
Appropriations to reserves		16,984,447	
Miscellaneous		5,602,761	
Deficits of weak lines		4,996,195	
Surplus available for adjustments and improvements		113,205,088	\$724,483,163

This table shows the actual disposition made of the net income from operation of the roads reporting to this Bureau, representing 97% of the railway business of the United States, except that \$120,784,982 of the income from other sources has been eliminated from the account and applied to offset the rental paid by the reporting roads.

It will be observed that the gross dividends declared were only \$226,791,289, which is 3.64% on the par value of the stock of the 368 reporting companies.

MISREPRESENTATIONS AS TO DIVIDENDS.

The discrepancy between this condition and the official statement as to dividends declared in 1908 calls for an analysis of the latter. This reads, "The amount of dividends declared during the year (1908) was \$386,879,362, being equivalent to 7.99% on dividend-paying stock. For the year ending June 30, 1907, the amount of dividends declared was \$308,088,027."

Two income accounts—one of operating roads and the other of leased roads—for the year ending June 30, 1908, give a clew as to how the Official Statistician more than doubles the dividends actually paid out of transportation revenues. The gross total is made up of these four items:

Operating roads:	
Dividends declared from current income.....	\$271,328,453
Dividends declared out of surplus.....	57,733,808
Leased roads:	
Dividends declared from current income.....	33,843,577
Dividends declared out of surplus.....	27,550,596
Total.....	\$390,456,434

As these income accounts show that the operating companies received \$280,427,460 "other income" from outside operations and sources other than transportation, and the leased roads received \$111,153,013 "income from lease of road," the source of the major part of this fictitious dividend is revealed. The \$280,427,460 from other sources would pay the entire income of the leased roads and leave nearly \$170,000,000 to extinguish so much of the dividends declared by the operating roads.

Modified as to details, this is what actually occurs every year. In the year 1908 the total amount paid out of transportation revenues on account of capital of the 97% of the railways of the United States reporting to this Bureau was represented in the sums:

Net interest on funded debt.....	\$282,354,000
Interest on current liabilities.....	31,835,708
Rent paid for lease of roads.....	113,529,261
Net dividends.....	104,074,006
Total.....	\$531,792,975

This total was equivalent to 4.15% on the net capitalization of the roads represented. The rental paid the lessor roads constituted the fund from which those roads paid their interest and dividends. Further remark on the misleading and harmful statement of the Official Statistician as to dividends declared in 1908 is unnecessary.

V

COST OF CONSTRUCTION

Incomplete as are the figures of the cost of the railways of the United States, and exclusive as they are of the millions put back into the properties out of income for additions, betterments and reconstruction in the process of operation, yet the statistics of the cost of construction and equipment afford a complete answer to all charges that American railways are over-capitalized.

Upon the question of the cost of road and equipment in 1909, the returns of the 368 roads reporting to this Bureau furnish the following data:

**SUMMARY OF COST OF ROAD AND EQUIPMENT COVERING 221,132
MILES OF OPERATED LINE FOR 1909.**

Item	Amount
Cost of road (182,046 miles owned).....	\$6,603,504,463
Cost of equipment.....	1,122,409,813
Undistributed cost of road and equipment.....	3,080,064,960
Cost of 39,086 miles leased lines rental capitalized.....	2,415,699,876
Total.....:	\$13,220,678,876

Adding to this \$296,750,000 to represent the 11,870 miles of road not reporting to this Bureau at \$25,000 per mile, we obtain

\$13,417,438,876

as the cost of road and equipment of the 233,002 miles of line employed in the transportation industry of the United States in 1909, or

\$58,031 per mile of line.

This is an underestimate by reason of the failure of a few lines to furnish even approximate figures on the accumulated cost of their properties. Averaging the cost of locomotives at \$15,000, of passenger cars at \$6,000, of freight cars at \$800, and of company's cars at \$500 apiece—their present cost rates much higher—the equipment of American railways represents an investment of over \$3,000,000,000, and its bare maintenance alone involves an expenditure of nearly \$400,000,000 annually.

PHYSICAL VALUATION OF THE RAILWAYS.

It is worthy of passing note that just as the railway companies have shown their indifference to a physical valuation of their property, the clamor of regulators and agitators in its favor has subsided. The proposal lost its attractiveness to them the moment they became convinced that such an investigation would put a valuation on the roads so high as to take not only the wind out of their sails but the last drop of water out of their mouths. To-day the only insistent demand for this futile undertaking comes from quarters interested in the distribution of the appropriation of several millions it would cost.

Credit for the reversal in the popular and political attitude on this subject is largely due to the valuations attempted by the states of Minnesota, Washington and Wisconsin. The results in these states may be briefly summarized as follows:

	Miles of Line	Capitalization per Mile	Valuation by State, per Mile
Minnesota, 1907	7,596	\$44,206	\$54,201
Washington, 1908:			
Great Northern	806	44,078	73,900
Northern Pacific	942	70,278	106,500
Oregon R. R. & Navigation Co.	501	43,012	38,900
Wisconsin, 1906	7,135	33,424	34,630

Even Senator Albert B. Cummins of Iowa has seen such a bright light on this subject that in his speech before the Traffic Club of Chicago last February he said that he would not be willing to make a present valuation of railroad property a basis for determining rates, "for the reason that it was more than probable that the present capitalization of between fifteen and sixteen billions would be increased to twenty billions."

In the Bureau's Statistics for 1908 it was said:

"If the valuations in Minnesota and Washington, made by none too friendly commissions, are any criterions of what a national valuation made under presumably unbiased federal authority would be, the present cost to reproduce the railways of the United States would be nearer \$20,000,000,000 than any sum within the anticipations of those agitating for such valuation."

CAPITALIZATION OF FOREIGN RAILWAYS.

With both sides of the balance sheet testifying to a capital investment in American railways of under \$60,000, and official valuation abandoned *because it would demonstrate that they could not be reproduced for less than \$80,000 per mile*, the reader is asked to compare the American figures with those of the capitalization, or cost of construction, of the principal foreign countries set forth below. These have been compiled from the latest available official returns.

SUMMARY OF RAILWAY CAPITALIZATION OF THE PRINCIPAL FOREIGN RAILWAYS FROM LATEST DATA.

Year	Country	Miles of Line	Capital or Cost of Construction	Per Mile
	Europe:			
1908	United Kingdom.....	23,205	\$6,382,296,742	\$275,040
1908	Germany.....	35,558	3,903,848,400	109,788
1907	Russia in Europe (exclusive of Finland).....	32,900	†3,170,876,360	80,985
1907	France.....	†24,730	3,447,366,000	139,390
1907	Austria.....	13,427	1,515,576,885	112,879
1907	Hungary.....	11,769	741,586,391	63,010
1907-08	Italy (State roads only).....	8,699	1,086,000,000	124,730
1905	Spain (13 roads).....	6,840	583,632,000	85,327
1906	Sweden.....	7,938	257,408,450	32,427
1907	Belgium (State only).....	2,537	430,800,000	169,806
1907	Switzerland.....	2,740	298,709,210	109,000
	Other Countries:			
1909	Canada.....	24,104	1,608,990,656	66,752
1908	British India.....	30,576	1,364,669,375	44,632
1907	Argentine Republic.....	13,690	820,433,796	59,930
1908	Japan.....	4,444	190,173,728	42,800
1909	New South Wales.....	3,623	231,870,440	63,999
1909	United States of America.....	233,002	13,508,711,173	57,976

†Russian capitalization, including railways in Asia, covers a total of 39,277 miles, from which the capital per mile is computed.

‡This is exclusive of 4,259 miles of local interest.

The most striking feature in this table is the steady advance it shows in the capital cost of German railways. In ten years this has increased from 251,597 marks per kilometer in 1898 to 283,608 in 1908, *i. e.* 31,731 marks per kilometer or \$12,282 per mile. This means an increase of \$991,687,440 in capital cost for an increase of only 5,525 miles of line.

VI

OWNERSHIP OF AMERICAN RAILWAYS

Returns to this Bureau place the number of stockholders of record at the date of the last election of directors prior to June 30, 1909, of the 368 roads reporting at 320,696. As only 182,046 of the 221,132 miles operated by these roads was covered by the capital stock, this would show $1\frac{1}{4}$ stockholders for each mile of road and would indicate that there are at least 415,000 stockholders in all the railways of the United States. Owing to the incompleteness of the returns on this subject and the fact that large blocks of stock are held in the names of associations and trustees, it is safe to estimate that the actual ownership of railway stock is distributed among at least 440,000 persons.

In 1905 the Commission reported the number of stockholders of record prior to June 30, 1904, as 327,851, but has given no later figures. It may be of interest to compare these figures with the partial reports to this Bureau since then.

Year	Number Reporting	Number of Stockholders
1904.....	1,182 roads	327,851
1906.....	284 "	226,986
1907.....	317 "	240,554
1908.....	315 "	315,727
1909.....	340 "	320,696

If the ownership of railway bonds, which is even more widely distributed than that of stocks, could be traced, it would be found that over a million investors are interested in the financial welfare of the railways. This would give to each an interest of \$13,000, from which the average income is not over \$520 a year.

The attempt of the Commission in 1908 to secure evidence that the control of the railways was concentrated in a few hands by calling for a statement of the "ten largest holders of voting securities" of the reporting companies having established that nowhere did they *own* a majority or an approach to a majority of the controlling stock, inquiry along that line was dropped in 1909.

In railways, as in any republic, the latent power is widely distributed among the many, while the administrative responsibility is necessarily entrusted to the few.

VII

PUBLIC SERVICE OF THE RAILWAYS

It is the reproach of our system of government statistics of railways that their first concern is financial results, which the government takes no thought to improve, and the harrowing roll of accidents, and not the adequacy of the service and the steady development of the means of transportation. Every month, almost every week, the public is informed of the volume of traffic, and every quarter the record of casualties is told in sensational head lines. It is left for belated annual reports to record the public service of this great industry upon whose progressive efficiency every other industry in the United States depends.

It is not upon what the railways earn, but upon what they DO that the whole industrial fabric of the republic rests. It is not upon the dividends they pay but upon the traffic they carry, the net income withheld from dividends and put into improvements, that their success as carriers depends.

THE PASSENGER TRAFFIC.

In considering the public service of the railways it is customary to give first attention to the passenger traffic. This is not because it is the most important branch of the service but because passengers are numbered by millions, where thousands suffice in the enumeration of the shippers, who frequently mistake themselves for the entire American people.

In twenty years between June 1, 1889, and June 1, 1909, the population of the United States increased from 61,289,000 to 88,806,000, or nearly 45%. In the meantime the passenger cars provided by the railways increased from 24,586 to 46,026, or over 87%. But this does not measure the liberal provision made by the railway for the travelling public, which is more fully and accurately expressed by the amazing growth of the number of passengers carried one mile from 11,553,820,445 in 1889 to approximately 29,452,000,000 in 1909, or nearly 155%.

Here is shown an increase of cars not far short of double the increase in population and an increase in passengers carried proportionately greater than the numerical increase in cars.

In the meantime the average receipts of the traffic have declined from 2.165 cents per passenger mile in 1889 to 1.916 in 1909—a

decline of over 11%, although every item involved in the service, locomotives, cars, track, stations, labor, etc., cost more. The passenger service, except as precursor to the freight service, and in certain densely populated sections, was unremunerative in 1889 and is more so now. It is maintained at the expense of the freight service by what the Railroad Commission of Wisconsin has characterized as "a species of piracy practiced upon the shippers of freight."

The salient features of the passenger service reported to this Bureau for the year 1909, as compared with the final official returns for the preceding year, are shown in the following statement:

Item	Bureau Figures 1909	Official Figures 1908
Miles of line represented.....	221,132	230,494
Passengers carried.....	854,255,337	890,009,574
Passengers carried 1 mile.....	28,788,855,000	29,082,838,944
Passenger revenue.....	\$551,634,278	\$566,832,746
Mileage of passenger trains.....	491,903,107	500,000,000
Average number of passengers in train.....	58	59
Average cars to a train.....	5.3	.....
Passenger car miles.....	2,594,508,987	.....
Average passenger journey (miles).....	33.71	32.66
Average receipts per passenger mile (cents).....	1.916	1.937

According to the monthly reports to the Interstate Commerce Commission covering an average of 233,002 miles of line, the passenger revenues in 1909 were \$564,302,580, or \$1,943,077 less than the above revenues for only 228,164 miles of line in 1908.

The average receipts per passenger mile in 1909 are the lowest ever reported for American railways.

Taken in connection with the official returns covering the period since 1900, the above figures afford evidence of the confiscatory effect of the 2-cent passenger laws on railway revenues, as appears from the following statement:

SUMMARY OF PASSENGER MILEAGE, REVENUE AND RECEIPTS PER
PASSENGER MILE, 1900 TO 1909.

Year	Passengers Carried One Mile	Increase Over Preceding Year (Per Cent)	Passenger Revenue	Receipts per Passenger Mile
1900.....	16,038,076,200	.....	\$323,715,639	2.003
1901.....	17,353,588,444	8.2	351,356,265	2.013
1902.....	19,689,937,620	13.4	392,963,248	1.986
1903.....	20,915,763,881	6.2	421,704,592	2.006
1904.....	21,923,213,536	4.8	444,326,991	2.006
1905.....	23,800,149,436	8.6	472,694,732	1.962
1906.....	25,167,240,831	5.7	510,032,583	2.003
1907.....	27,718,554,030	10.1	564,606,343	2.014
1908.....	29,082,836,944	4.9	566,245,657	1.937
1909.....	29,452,000,000	1.3	564,802,580	1.916
Increase, per cent.....	83.7	.....	74.6	.....

Here it is shown that the passenger service rendered has increased 12% more than the passenger revenues. But more significant than this is the column of yearly increases in service by percentages. This utterly explodes the theory that passenger travel is greatly stimulated by low fares—aside from some positive incentive to increased travel, such as periodical expositions, the Louisiana Purchase Exposition for instance, the effect of which is clearly traceable in the increased service in 1905, which includes the heavy travel during the months of heavy attendance, July 1 to December 1, 1904.

The 2-cent passenger laws were passed so as to become generally effective July 1, 1907, and their effect on passenger receipts during the following year was such that these receipts were actually less in 1909 than in 1907, although the service performed by the railways was over 6% greater. Had the railways received the same rate in 1909 that they did in 1907 their revenue from passengers would have been nearly \$29,000,000 more than it was.

PASSENGER TRAFFIC 1909-1888.

F In the next statement the salient facts in regard to the passenger traffic since the Commission began collecting the data is passed under review.

Year	Passengers Carried (Millions)	Passengers Carried One Mile (Millions)	Mileage Passenger Trains (Millions)	Average Passengers in Train	Average Journey Miles	Passenger Revenue (Millions)	Average Receipts per Passenger Mile (Cents)
1909	888	29,452	507	58	33	564	1.916
1908	890	29,082	500	59	33	566	1.937
1907	873	27,718	509	51	32	564	2.014
1906	797	25,167	479	49	31	510	2.003
1905	738	23,800	459	48	32	472	1.962
1904	715	21,923	440	46	31	444	2.006
1903	694	20,915	425	46	30	421	2.006
1902	649	19,689	405	45	30	392	1.986
1901	607	17,363	385	42	29	351	2.013
1900	576	16,038	363	41	28	323	2.003
1899	523	14,591	347	41	28	291	1.978
1898	501	13,379	334	39	27	267	1.973
1897	489	12,256	335	37	25	251	2.022
1896	511	13,049	332	39	26	266	2.019
1895	507	12,188	317	38	24	252	2.040
1894	540	14,289	326	44	26	285	1.986
1893	593	14,229	335	42	24	301	2.108
1892	560	13,362	317	42	24	286	2.126
1891	531	12,844	308	42	24	281	2.142
1890	492	11,847	285	41	24	260	2.167
1889	472	11,553	277	42	25	254	2.199
1888	412	10,101	252	40	24	237	2.349
Increase 1888 to 1907	115%	191%	101%	45%	38%	138%	
Decrease							18.4

The several increases shown in the first, second, third and sixth columns of the table reflect the general advancement in passenger traffic. That of 45% in the average passengers to a train marks the progress in density of that traffic which may eventually place it on a profitable basis. In Massachusetts, where this density yields an average of 79 passengers to a train there is no demand for a two-cent rate statute, for the conditions have made a rate of 1.64 cents profitable. In the group of states consisting of Ohio, Indiana, Michigan, Illinois, Iowa, Wisconsin and Minnesota, where the density of traffic yields only 46 passengers by train, a statutory two-cent fare becomes confiscatory because it costs at least one dollar to operate a passenger train one mile and 46 times two cents is only 92 cents. Moreover the 46 passengers per train is only an average and there are as many trains that average less as more. The average has to be raised above 50 to yield any margin of profit on passenger traffic. If it were not for the density of traffic in the New England and North Atlantic group of states the average for the entire United States would be well below 46 passengers per train.

The steady increase in the distance traveled per passenger reflects the effect of trolley competition in diverting the short haul passenger traffic.

The most noteworthy feature of the seventh column is the decline of 98/1000ths of a cent in the average receipts per passenger mile between 1907 and 1909, making a new low record after hovering around the two cent mark for fourteen years. As noted above, this reduction in the average cost the railways nearly \$29,000,000 on the passenger traffic of 1909.

In this connection it is interesting to recall that between 1888 and 1893 the Official Statistician, then as now Professor Adams, made the following computation of the average cost of carrying one passenger one mile for the whole United States:

	1888	1889	1890	1891	1892	1893
Average cost of carrying a passenger one mile, cents	2.042	1.993	1.917	1.910	1.939	1.955

It will be observed that the average receipts per passenger mile in 1909 are below the computed cost in every one of the years above named, except 1891. When the advance in the cost of everything necessary to the service—track, labor, equipment, conveniences, speed, terminal facilities—is considered, the practical coincidence of average cost and receipts leaves no margin for legitimate profits.

RECEIPTS FROM MAIL AND EXPRESS.

Closely associated with the passenger traffic of the railways are the mail and express service. Although principally carried by passenger trains, each has a special service of its own by mail and express trains. But all are included under the passenger service. The receipts from these two branches of the service during the last decade are shown in the following statement:

SUMMARY OF RECEIPTS FROM MAIL AND EXPRESS, 1899 TO 1908.

Year	Mail		Express	
	Revenues	Percentage of Earnings	Revenues	Percentage of Earnings
1899.....	\$35,999,011	2.74	\$26,756,054	2.04
1900.....	37,752,474	2.54	28,416,150	1.91
1901.....	38,453,602	2.42	31,121,613	1.96
1902.....	39,963,248	2.31	34,253,459	2.07
1903.....	41,709,396	2.19	38,331,964	1.98
1904.....	44,499,732	2.25	41,875,636	2.12
1905.....	45,426,125	2.18	45,149,155	2.17
1906.....	47,371,453	2.04	51,010,930	2.19
1907.....	50,378,964	1.94	57,332,931	2.21
1908.....	48,517,563	2.03	58,602,091	2.45
1909.....	50,935,000	2.08	63,669,000	2.60
Increase, per cent.....	41.5		138.0	

Aside from the striking contrast in the percentages of increase of revenues from these two sources, the most significant feature of this table is the reversal it shows in their respective importance from the railway revenue point of view. Prior to 1905, carrying the mails brought larger, if not more profitable, returns to the railways. Since then the returns from express have increased so much more rapidly that they are now nearly 23% more than those from mails.

If proof were needed of the absolute falsity of the charge that the railways are receiving an exorbitant rate for carrying mail, the above table of their receipts from the service in connection with the following statement of mail handled and revenues in view of the finding of the Joint Commission of Congress in 1899 would furnish it. After a thorough investigation of the subject lasting from August, 1898, to July, 1900, the Commission came to the following conclusion:

"Upon a careful consideration of all the evidence and the statements and arguments submitted, and in view of all the services rendered by the railroads, we are of the opinion that the prices now paid to the railroad companies for the transportation of the mails are not excessive, and recommend that no reduction thereof be made at this time."

The increase in the railroad service since this report was made is shown in the following statement of miles of mail transportation by railroads, the postal revenues and the number of clerks in the railway mail service since 1899:

	Annual Transportation of Mail by Railroads (Miles)	Postal Revenues	Number of Railway Mail Clerks
1899.....	287,591,269	\$95,021,384	8,388
1900.....	297,256,303	102,354,579	8,695
1901.....	302,613,325	111,631,193	9,105
1902.....	312,521,478	121,848,047	9,627
1903.....	333,491,684	134,224,443	10,418
1904.....	353,038,397	143,582,624	11,621
1905.....	362,645,731	152,826,585	12,474
1906.....	371,661,071	167,932,783	13,598
1907.....	387,557,165	183,585,006	14,357
1908.....	407,799,039	191,478,663	15,295
1909.....		203,562,383	15,866
Increase in 10 years, per cent.....	50.5	124.7	89.1

Compared with the increase of only 41.5% in the revenues from mail received by the railways during the same period, each one of the above percentages testifies to a positive reduction in the rate received by the railways for the service. And if the increase in weight of mail carried in 1909 were known, the contrast between the service and the pay would be more striking. In 1899 the total weight of all mail was reported as 635,180,362 pounds. In 1907 the estimates made from the special weighing placed the weight of mail carried that year at 1,290,358,284 pounds, or an increase of nearly 105% in eight years. By reference to the table on page 64 it will be seen that the railway revenues from mail between 1899 and 1907 increased only 40%. The contrast is illuminating. In its light the charge that the railways are in any way responsible for the postal deficit is grotesque.

FREIGHT TRAFFIC

According to the monthly returns to the Interstate Commerce Commission, the proportion of revenues from freight of the railways of the United States to total earnings from operation, for the years 1908 and 1909, receded to the unusually low figures of 68.51% and 68.88% respectively. The official summary for 1908, based on the annual returns, shows a proportion of 69.17% for that year, which probably is nearer the mark.

The annual reports to this Bureau for 1909 yield a proportion of 69.18% for last year.

Accepting this proportion taken from the annual returns as being based on the same character of reports as those from which former ratios were derived, the preponderance of freight traffic is shown

in bold relief in the following statement of the ratio of its revenues to total earnings from operation, 1899 to 1909:

Year	Proportion of Freight Revenues to Total Earnings	Year	Proportion of Freight Revenues to Total Earnings
1899.....	69.55%	1905.....	69.67%
1900.....	70.56%	1906.....	70.54%
1901.....	70.41%	1907.....	70.44%
1902.....	69.93%	1908.....	69.17%
1903.....	70.39%	1909.....	69.18%
1904.....	69.82%		

The average proportion for the nine years preceding 1908 is seen to be slightly above 70%, and the fact that it was almost one point below 70% in 1908 and 1909 indicates that it was the freight traffic that bore the brunt of the business depression which curtailed railway revenues during those years.

In no other of the leading countries of the world does the freight traffic assume the overwhelming relative proportion that it does in the United States. In the United Kingdom it amounts to 50.35%; in France to 53.64%; and in Germany, including express and mail, to 65%. If these were classed with freight in the United States, it would raise the proportion for that traffic here to over 74%.

FREIGHT TRAFFIC 1909 AND 1908.

The next statement presents the significant items of the freight traffic in 1909 for the roads reporting to this Bureau compared with those of the final official returns for the preceding year.

Item	1909 Bureau Figures	1908 Official Figures
Miles operated.....	221,132	230,494
Number of tons carried.....	1,441,012,426	1,532,981,790
Tons carried 1 mile.....	217,756,776,000	218,381,554,802
Freight revenue.....	\$1,643,028,564	\$1,655,419,108
Mileage of freight trains.....	560,602,557	597,734,414
Number of cars in train.....	29.7	28.3
Average number of tons in train.....	388	360
Average haul per ton (miles).....	151.1	142.5
Average receipts per ton mile (mills).....	7.54	7.54

Experience has shown that in comparing these statements of averages for passenger and freight traffic, allowance has to be made for the fact that the Bureau's figures include all the great systems

and are exclusive of some 13,000 miles of minor lines. It is difficult to estimate the effect of these discrepancies with anything like exactness. But complete returns invariably show a shorter mean haul and journey for the entire country than the Bureau's figures indicate and also a less train load of passengers and freight, the result being a slightly higher average for passenger and freight ton receipts per mile.

Last year from its returns the Bureau computed the passenger mile receipts at 1.933 cents and the ton mile receipts at 7.53 mills. The Commission's final figures were 1.937 cents and 7.54 mills respectively.

FREIGHT TRAFFIC 1909 TO 1888.

In the next summary is presented a condensed statement of the significant data relating to the freight traffic for the twenty-two years that the Commission has been compiling statistics.

SUMMARY OF TONS CARRIED, TON MILEAGE, MILEAGE OF FREIGHT TRAINS, AVERAGE TONS IN TRAIN, FREIGHT REVENUES AND AVERAGE RECEIPTS PER TON MILE.

Year	Tons Carried (Millions)	Tons Carried One Mile (Millions)	Mileage Freight Trains (Millions)	Average Tons in Train	Average Haul per Ton (Miles)	Freight Revenue (Millions)	Receipts per Ton Mile (Cents)
1909	21,486	222,900	579	388	151	\$1,682	.755
1908	1,532	218,381	597	360	143	1,655	.754
1907	1,796	236,601	629	357	131	1,823	.759
1906	1,631	215,877	594	344	132	1,640	.748
1905	1,427	186,463	546	322	130	1,450	.766
1904	1,309	174,522	535	307	133	1,379	.780
1903	1,304	173,221	526	310	132	1,338	.763
1902	1,200	157,289	499	296	131	1,207	.757
1901	1,089	147,077	491	281	135	1,118	.750
1900	1,081	141,596	492	270	130	1,049	.729
1899	943	123,667	507	243	131	913	.724
1898	863	114,077	503	226	132	876	.753
1897	728	95,139	464	204	130	772	.798
1896	765	95,328	479	198	124	786	.803
1895	696	85,227	449	189	122	729	.839
1894	638	80,335	446	179	125	699	.860
1893	745	93,588	508	183	125	829	.878
1892	706	88,241	485	181	124	799	.898
1891	675	81,073	446	181	120	736	.895
1890	636	76,207	435	175	119	714	.941
1889	539	68,727	383	179	127	644	.922
1888	480	61,329	348	176	128	613	1.001
<hr/>							
Increase 1888 to 1909		263%	66%	120%	18%	174%	.....
Decrease							24.0%

(a) Figures for 1909 computed on basis of returns to this Bureau.

(b) Includes 75% of mixed train mileage, that being the practice prior to 1900.

Mark the one column which shows a decrease. This means a remission of almost exactly a quarter of a cent per ton mile in the average receipts from freight. On the tonnage carried in 1909 it meant a saving of over \$540,000,000 to the shippers. In the presence of the present high price of everything carried by the railways, there is no ground for assuming that any portion of this half billion dollars withheld from the railways ever reached the ultimate consumer. On the contrary the presumption is unavoidable that it has been absorbed by the shippers and consignors, whose profits are greater than ever.

PROPORTION OF COMMODITIES MOVED 1899-1909.

Referring to the movement of different classes of commodities in his report for 1904, the Official Statistician said: "A slight change in the ratio of freight carried for any one of the classes named may have decided results, not only upon the earnings of the roads, *but upon the average rate per ton mile.*" But without knowing the length of the haul of the respective classes, any estimate of the effect of such variation must be largely speculative.

In 1909, for the first time the Bureau undertook to collect the information as to the tonnage of the main divisions of commodities carried. Its inquiries were limited to the tonnage originating on the several roads, and the next statement presents the results in comparison with the official figures for 1907, which are the last available:

TONNAGE AND PROPORTION OF DIFFERENT CLASSES OF COMMODITIES MOVED 1909 AND 1907.

Class of Commodity	1909		1907	
	Tonnage Reported as Originating on Line	Per Cent of Aggregate	Tonnage Reported as Originating on Line	Per Cent of Aggregate
Products of agriculture.....	76,955,131	9.49	77,030,071	8.62
Products of animals.....	21,807,486	2.69	20,473,486	2.29
Products of mines.....	449,938,248	55.50	476,899,638	53.39
Products of forests.....	83,679,179	10.33	101,617,724	11.38
Manufactures.....	109,625,669	13.52	137,621,443	15.41
Merchandise.....	35,500,833	4.38	34,718,487	3.89
Miscellaneous.....	33,318,272	4.09	44,824,123	5.02
Total.....	810,784,818	100.00	893,184,972	100.00

NOTE.—These tables fail to include nearly 200,000,000 tons unassigned.

The most significant feature of this statement is the marked decrease, absolutely and relatively, in the tonnage of manufactures carried. Great as was the decrease in the tonnage of animals carried there was an increase relatively.

The next statement shows the percentages of commodity tonnage moved since the Commission has compiled the information divided between low and high rate freight.

**SUMMARY SHOWING PERCENTAGE OF FREIGHT TRAFFIC MOVEMENT
BY CLASSES OF COMMODITIES, 1907 TO 1899.**

Year	Low Rate Freight Percentage of Aggregate					High Rate Freight Percentage of Aggregate			
	Products of Agriculture	Animals	Mines	Forest	Total	Manufactures	Merchandise	Miscellaneous	Total
1899.....	11.33	3.12	51.47	10.89	76.81	13.45	4.49	5.25	23.19
1900.....	10.35	2.87	52.59	11.61	77.42	13.41	4.26	4.91	22.58
1901.....	10.76	2.91	51.67	11.67	77.01	13.75	4.16	5.08	22.99
1902.....	9.23	2.64	52.36	11.64	75.87	14.49	4.37	5.27	24.13
1903.....	9.56	2.63	51.56	11.67	75.42	14.39	4.69	5.50	24.58
1904.....	9.59	2.74	51.56	12.53	76.42	13.41	4.83	5.34	23.58
1905.....	9.03	2.54	53.59	11.24	76.40	13.60	4.32	5.68	23.60
1906.....	8.56	2.32	53.09	11.24	75.21	14.81	4.06	5.92	24.79
1907.....	8.62	2.29	53.39	11.38	75.68	15.41	3.89	5.02	24.32
1908.....									
1909.....	9.49	2.69	55.50	10.33	78.01	13.52	4.38	4.09	21.99

It will be observed that the percentage of low rate freight carried in 1909 was greater than for any other year covered by these statistics. This was due more to the falling off in manufactures and miscellaneous freight than to any increased movement of low class freight.

CAR SERVICE OPERATIONS.

What the Department of Commerce and Labor calls "a convenient index to the traffic activities of the country" is found in the following comparative statement of cars handled by the various car service associations and demurrage bureaus, 1905-1909.

**NUMBER OF CARS HANDLED BY 36 CAR SERVICE ASSOCIATIONS AND
DEMURRAGE BUREAUS DURING TWELVE MONTHS
ENDING DECEMBER, 1905-1909.**

Names of Associations and Bureaus	Twelve Months Ending December				
	1905	1906	1907	1908	1909
Alabama.....	752,982	744,548	779,402	631,487	700,393
Central New York.....	611,601	654,861	753,269	738,054	804,419
Central (St. Louis).....	863,788	908,096	919,130	838,017	1,001,136
Chicago.....	2,166,910	2,251,763	2,282,191	2,161,767	2,790,801
Cincinnati.....	675,117	748,763	771,990	635,365	712,145
Cleveland <i>a</i>	640,364	796,687	1,016,003	715,764	843,609
Colorado.....	425,140	455,540	445,900	385,280	428,760
Columbus.....	394,152	443,638	469,773	363,130	401,696
East Tennessee.....	320,855	358,733	388,066	293,597	330,055
Indiana.....	912,827	962,941	1,104,855	1,077,786	1,211,793
Intermountain.....	116,533	158,231	184,577	153,885	201,077
Lake Superior.....	332,633	371,312	415,642	338,109	370,490
Louisville Car.....	495,095	541,945	508,528	518,955	585,748
Memphis.....	235,569	258,316	255,169	239,156	224,648
Michigan.....	687,428	766,950	838,928	696,926	859,812
Missabe Range.....	30,241	37,613	42,788	42,930	51,934
Missouri Valley.....	1,538,087	1,665,882	1,910,139	1,603,758	1,883,052
Nashville.....	300,602	336,110	351,572	326,385	337,234
New York and New Jersey.....	997,304	1,100,067	1,409,161	1,248,609	1,416,831
North Carolina.....	357,474	374,710	407,257	404,334	445,398
Northeastern Pennsylvania.....	802,072	833,443	917,936	633,655	594,231
Northern.....	1,467,041	1,722,345	1,736,981	1,515,706	1,636,588
Pacific.....	761,382	972,398	1,166,883	1,147,345	1,390,648
Pacific Northwest.....	647,726	727,474	888,093	845,405	987,115
Philadelphia.....	2,056,744	2,218,755	2,326,723	1,921,142	2,508,204
Pittsburg.....	3,375,530	3,295,463	2,935,299	1,977,891	2,807,256
Southeastern.....	813,444	862,379	853,720	823,918	981,737
Southern.....	273,273	301,273	492,914	513,437	649,384
Texas.....	932,992	977,630	986,475	1,118,622	1,302,211
Toledo.....	262,875	312,329	530,617	383,870	492,127
Virginia and West Virginia.....	818,915	866,861	893,905	778,940	912,231
Western New York.....	812,409	881,640	986,962	806,488	931,185
Western (Omaha).....	622,868	718,872	770,470	733,346	775,828
Wisconsin.....	1,157,036	1,119,326	1,118,720	1,022,270	1,003,050
Total reported by 34 asso- ciations and bureaus ^b ...	27,659,009	29,749,894	31,858,039	27,638,339	32,569,156
Baltimore and Washington De- murrage Bureau.....	c721,428	c740,903	c735,103	588,930	672,954
Illinois and Iowa Demurrage Bureau.....	(d)	3,054,315	3,258,770	(d)	3,561,740

^aCleveland reported 10,016 lake coal cars for December, 1909.

^bThe Butte Terminal Association was superseded by the Montana Demurrage Bureau in May, 1908. The returns of the new bureau for the twelve months ending December, 1909, 448,381 cars

^cFigures apply to larger territory; change and revision of 1907, 1908 and 1909 figures made October 1, 1909.

^dNot reported.

VIII

EARNINGS AND EXPENSES

Having in the preceding pages given the facts as to the provision made by the railways for fulfilling their obligations as common carriers, it is now in order to present a brief review of their receipts and expenditures in relation to their public service.

For the second successive year the Bureau has to warn the reader that innovations in the forms of keeping railway accounts prescribed by the Commission preclude the making of strictly accurate comparisons of the returns for 1909 with those of any preceding year. In submitting its report for 1908 the Commission made the following explanation:

"A number of important changes have been made in the annual report forms for 1908, particularly in the grouping of certain items in connection with the Income Account and the Profit and Loss Account. The figures which follow do not include returns applying to carriers classed as switching and terminal. The changes in the income account submitted in the report under consideration are so far reaching in their results, in a number of instances, as to impair direct or close comparison with figures for similar items contained in previous statistical reports."

In the comparative Income Account below, which aims to present the situation as it would result from the actual operations had such operations been conducted by a single corporation, the Bureau has sought to make the returns for 1908 and 1909 conform as nearly as possible to "previous statistical reports." It should be premised, however, that the official figures for 1908 exclude the returns from switching and terminal companies, whereas the Bureau's figures for 1909 include some portion of these returns, which are as much an integral part of the transportation service of American railways as any they perform. The official figures for 1908 do not correspond absolutely to the preliminary figures for the same year compiled from the monthly reports as reviewed in the Introduction to this report.

With this by way of explanation, the comparative Income Account for the years 1909 and 1908 is submitted:

COMPARATIVE INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED STATES CONSIDERED AS A SYSTEM FOR THE YEARS ENDING JUNE 30, 1909 AND 1908.

Item	Amount			
	1909 (221,132 miles operated)		1908 (230,002 miles operated)	
Passenger revenue.....	\$ 551,634,278		\$ 566,832,746	
Mail revenue.....	49,508,972		48,517,563	
Express revenue.....	61,883,695		58,692,091	
Freight revenue.....	1,643,028,564		1,655,419,108	
Other earnings from operation.	69,086,257		64,344,481	
Gross earnings from operation.		\$2,375,141,766		\$2,393,805,989
Operating expenses.....	\$1,568,111,272		\$1,669,547,876	
Taxes.....	82,650,214		78,673,794	
Total.....	\$1,650,761,486	1,650,761,486	\$1,748,221,670	1,748,221,670
Net earnings from operation...		724,380,280		645,584,310
Net revenue from outside operations.....		5,410,338		5,977,268
Operating income.....		\$ 729,790,618		\$ 651,561,587
Disposition:				
Net interest on funded debt.	\$ 293,338,105		\$ 282,354,001	
Interest on current liabilities	22,546,779		31,835,708	
Rent paid for lease of road..	120,784,982		111,153,013	
Additions and betterments charged to income.....	24,807,546		28,086,454	
Appropriations to reserves and miscellaneous items..	22,587,208		21,636,182	
Other deductions.....	70,174,473		64,669,546	
Total deductions.....		\$ 554,239,093		\$ 539,734,904
Surplus available for dividends, adjustments and improvements.....		175,551,525		111,826,683
Net dividends.....		171,607,550		104,074,006
Balance to profit and loss.....		\$ 3,943,975		\$ 7,752,677

In 1909 the "Income Account" of the railways was swelled and confused by including therein \$200,725,696 of intercorporate payments, while that for 1908 includes \$274,450,192 "Other Income" which, as has been formerly noted by the Official Statistician, swells the totals to a fictitious figure. It is out of this fictitious income that fictitious interest and dividends are paid, fictitious deductions made, and fictitious surpluses accumulated. If "Other deductions" in the above statement had been charged against "Other income"

instead of being deducted from earnings from operation the balance to Profit and Loss for each year would have been so much larger.

What becomes of the rent paid by operating roads for leased roads is well shown in the statement included in the Commission's preliminary report of statistics for 1908 in which the amount received by the latter mentioned in the table just submitted is disposed of.

**CONDENSED INCOME ACCOUNT AND PROFIT AND LOSS ACCOUNT OF
LEASED ROADS FOR THE YEAR ENDING JUNE 30, 1908.**

Income Account		
Gross income from lease of road.....	\$111,153,013	
Salaries and maintenance of organization.....	390,841	
Taxes accrued.....	5,881,352	
Net income from lease of road.....		\$104,880,820
Other income.....		5,436,129
Gross corporate income.....		\$110,316,949
Deductions from gross corporate income.....		62,232,508
Net corporate income.....		\$ 48,084,441
Disposition of net corporate income:		
Dividends declared from current income.....	\$ 33,843,577	
Additions and betterments charged to income.....	1,088,002	
Appropriations to reserves and miscellaneous items.....	258,580	
Total.....		\$ 35,190,159
Balance carried forward to credit of profit and loss....		12,894,282

Profit and Loss Account		
Credit balance in Profit and Loss Account, June 30, 1907.....	\$ 45,852,031	
Credit balance brought from Income Account, June 30, 1908.....	12,894,282	
Total.....	\$ 58,746,313	
Dividends declared out of surplus.....	27,550,596	
Other profit and loss items—debit balance.....	2,006,573	
Balance credit June 30, 1908, carried to balance sheet.....	\$ 29,189,144	

Included under the blind item of "Deductions from gross corporate income, \$62,232,508" in this statement may be mentioned rents of other roads and facilities of which these leased roads are the lessees, interest on funded debt and other interest, sinking funds chargeable to income and other deductions not specifically pro-

vided for elsewhere. In case of operating roads this item also includes the balance of hire of equipment, to which, of course, there is a credit with other operating roads.

The significant feature in this statement is the decrease in the profit and loss credit balance of \$16,662,887. But this does not alter the fact that what becomes of rent paid for lease of road is no more a concern of interstate commerce than what becomes of the rent paid for warehouses or office space in any terminal. The operating roads pay all the cost of maintenance of way and equipment. The leased roads are not common carriers in any sense. They are simply distributing mediums of the rents paid them—this rent being the equivalent of interest on so much capital. As appears from the foregoing table, the expense of maintaining the organization of these leased properties amounted in 1908 to 35-100ths of 1 per cent.

DISTRIBUTION OF GROSS EARNINGS.

How the gross earnings of the railways reporting to this Bureau in 1909 (\$2,375,141,766) were distributed is shown in the next statement in comparison with a similar division of earnings in 1908 and 1907.

STATEMENT OF DISTRIBUTION OF GROSS EARNINGS OF 221,132 MILES
OF LINE IN 1909 COMPARED WITH THE PERCENTAGES FOR
1908 AND 1907.

(GROSS EARNINGS 1909, \$2,375,141,766.)

Item	Amount 1909	Per Cent 1909	Per Cent 1908	Per Cent 1907
Operating expenses:				
Maintenance of way and structures.	\$ 299,757,077	12.62	13.41	13.27
Maintenance of equipment.....	358,747,371	15.10	15.42	14.22
Traffic expenses.....	48,453,707	2.08	2.00	.....
Transportation expenses.....	799,690,194	33.67	36.24	37.50
General expenses.....	61,462,923	2.58	2.58	2.54
Total.....	\$1,568,111,272	66.03	69.67	67.53
Disposition of same:				
Pay of employes.....	\$ 973,174,419	41.00	43.43	41.42
Fuel for locomotives.....	184,359,112	7.76	.....	7.74
Oil and water for locomotives.....	19,951,184	.84	.....	.88
Material and supplies.....	219,463,028	9.24	.....	11.81
Hire and rent of equipment and facilities.....	54,638,243	2.30	.....	2.46
Loss and damage.....	56,379,042	2.37	.....	1.83
Miscellaneous*.....	60,146,242	2.52	.....	1.39
Total expenses.....	\$1,568,111,272	66.03	69.67	67.53
Taxes†.....	88,531,566	3.72	3.53	3.10
Rentals of leased roads.....	114,903,630	4.84	4.64	4.69
Interest on funded debt and current liabilities.....	315,884,884	13.30	13.34	13.14
Dividends.....	171,607,550	7.23	4.42	8.78
Deficits of weak companies.....	20,223,246	.85	1.24	.19
Betterments, reserves and sundries...	47,494,754	2.00	2.07	1.50
Surplus.....	48,384,864	2.03	1.09	1.07
Total (gross earnings).....	\$2,375,141,766	100.00	100.00	100.00
Gross earnings 1908.....	2,393,805,989	.....	.....	.....
Gross earnings 1907.....	2,589,105,578	.....	.....	.....

*Legal expenses, advertising and insurance are included under "Miscellaneous"; stationery and printing under "Material and Supplies."

†Includes taxes paid by leased lines and deducted from rent.

Owing to the fact that interest on funded debt and dividends are paid out of the common fund derived from operation and investments, the amounts devoted to these items in the above statement are necessarily computations. That they are not underestimates is proved by the fact that the surplus would not permit of larger charges for interest and dividends paid out of net earnings. Any interest or dividends materially greater than the amounts stated above, not paid out of the rents accruing to leased roads as given, must necessarily be derived from other sources than transportation revenues, and has no place in railway accounts coming under the provisions of the Act to Regulate Commerce among the several states.

IX

TAXES

So far as taxes are concerned, seasons of prosperity, depression and marking time are alike to American railways. The burden of their taxation knows no recession but mounts steadily, absolutely, per mile and in proportion to gross earnings.

The 368 roads reporting to this Bureau owning 182,046 miles of line and operating 221,132 miles, of which 39,086 miles were leased, paid \$82,650,214 taxes in 1909. The Commission's report for 1908 shows that the leased roads paid \$5,881,352 taxes out of their rents. Putting a conservative estimate of \$200 a mile on the 11,870 miles of line not represented in this report would add \$2,374,000 to the above figures and bring the aggregate taxes paid by the railways of the United States in 1909 up to the striking total of \$90,905,566.

How railway taxation has increased absolutely and relatively to earnings and mileage during the past twenty-one years is shown in the following statement:

TAXES ANNUALLY AND RELATIVELY, 1889 TO 1909.

Year	Taxes Paid	Per Mile	Percent- age of Earnings
1909 (Official figures).....	\$89,026,226	\$382	3.73
1908.....	84,555,146	367	3.53
1907.....	80,312,375	353	3.10
1906.....	74,785,615	336	3.21
1905.....	63,474,679	292	3.04
1904.....	61,696,354	290	3.12
1903.....	57,849,569	281	3.04
1902.....	54,465,437	272	3.15
1901.....	50,944,372	260	3.20
1900.....	48,332,273	250	3.24
1899.....	46,337,632	247	3.53
1898.....	43,828,224	237	3.51
1897.....	43,137,844	235	3.84
1896.....	39,970,791	219	3.48
1895.....	39,832,433	224	3.70
1894.....	38,125,274	216	3.56
1893.....	36,514,689	215	2.99
1892.....	34,053,495	209	2.90
1891.....	33,280,095	206	3.04
1890.....	31,207,469	199	2.96
1889.....	27,590,394	179	2.86

In this table the figures for 1909 are based on the monthly reports to the Commission and are subject to revision, but they are

in substantial agreement with the estimate on the returns to the Bureau.

Observe that the highest ratio of taxes to gross earnings shown in this table was 3.84 per cent in 1897, when everything relating to railways, except taxes, was prostrated under the reign of receiver-ships that followed the panic of 1893. It was of 1897 that the Official Statistician recorded the fact that "70.10 per cent of outstanding stock paid no dividends, and 16.59 per cent of outstanding bonds, exclusive of equipment trust obligations, paid no interest."

There is instruction and warning behind the remarkable increase in the ratio of taxation shown in the figures for 1894 to 1897. There is the reflection of similar conditions in the rising ratios of 1908 and 1909.

X

DAMAGES AND INJURIES TO PERSONS

There are two items in railway accounts connected with the expense of operation that give the management most serious concern, because no means has been devised to limit or control them. In a leaflet issued by this Bureau in September last, it was estimated that the payments of American railways on account of "Injuries to Persons" and "Loss and Damage" for the year 1908 would approximate \$56,700,000, or more than 2.3 per cent of their gross earnings. The Commission has not yet made public the final figures for 1908, but the returns on these accounts of the 368 roads reporting to this Bureau for the year 1909, aggregate \$56,379,024, or 2.37 per cent of their gross earnings.

Divided according to the new system of accounting adopted by the Commission, these returns show the following figures:

SUMMARY OF PAYMENTS ON ACCOUNT OF INJURIES TO PERSONS AND
LOSS AND DAMAGE DURING THE YEAR 1909.

Account	Amount	Per Cent of Earnings
Injuries to persons.....	\$23,456,038	.99
Maintenance of way.....	\$ 2,702,066	
Maintenance of equipment.....	2,315,119	
Transportation.....	18,438,853	
Loss and damage.....	32,922,986	1.38
To freight.....	\$24,768,453	
To baggage.....	300,869	
To property.....	4,469,496	
To live stock, etc.....	3,384,168	
Total.....	\$56,379,024	2.37

Unlike many of the other expenses of American railways, the burden of this "cost of operation" does not fall heaviest on the large systems. In the case of one road of moderate importance payments on these two accounts amounting to 4.8 per cent of gross earnings were enough to tip the balance into a deficit after paying interest on funded debt; one minor but prosperous road, after paying 14 per cent of gross receipts to meet these two accounts, had nothing left for dividends after paying interest, which amounted to less than 10 per cent of its earnings; and a small third road after being called on to pay 21.5 per cent of its earnings for injuries and damages had only 6 per cent of its operating revenue left to pay interest on funded

debt, which called for 20 per cent of the earnings, and taxes reduced the net operating revenue to less than 4 per cent.

These are extreme cases but they illustrate how the "Injury and Damage" claims strike roads that can ill afford to pay them as well as the great systems which are the common prey of every claimant with enough of a grievance to interest an attorney who scents a contingent fee.

That the claims behind these expenses are largely meretricious is indicated, if not proved, by their disproportionate increase in the past ten years, during which the railways have expended millions in providing safeguards for their trains and employees. This increase absolutely and relatively to gross earnings is shown in the following statement:

**PAYMENTS ON ACCOUNT OF "LOSS AND DAMAGE" AND "INJURIES TO PERSONS" DURING THE DECADE 1899 TO 1909 AND PRO-
PORTION TO GROSS EARNINGS.**

Year	Loss and Damage		Injuries to Persons	
	Amount	Per Cent of Earnings	Amount	Per Cent of Earnings
1899.....	\$ 5,976,082	.455	\$ 7,116,212	.541
1900.....	7,055,622	.474	8,405,980	.565
1901.....	8,109,637	.510	9,014,144	.567
1902.....	11,034,686	.639	11,682,756	.676
1903.....	13,726,508	.722	14,052,123	.739
1904.....	17,002,602	.861	15,838,179	.802
1905.....	19,782,692	.946	16,034,727	.770
1906.....	21,086,219	.907	17,466,864	.751
1907.....	25,796,083	.996	21,462,504	.829
1908.....				
1909.....	32,922,986	1.386	23,456,038	.988
Increase in 10 years, per cent.....	450.5	204.6	229.6	82.6

Startling as are these increases absolutely, those relatively to earnings present a condition truly alarming, for which there is no apparent relief except through a revulsion in the popular tolerance of blackmail at the expense of the railways.

In no other country in the world are the railways held up on bogus claims for damages to the extent they are in the United States. Under the strict laws of the United Kingdom, as to compensation for damages and injuries, the British railways paid less than 7-10ths of 1 per cent of their earnings for all damages, losses and injuries, or less than one-third the proportion paid by American railways on the same account.

XI

LOCOMOTIVE FUEL

Despite the continuous improvements in the steam-producing capacity of railway locomotives per ton of coal, the steady advance in the cost of coal during the past ten years has more than offset the economies of locomotive construction. This is shown in the next statement, which gives the cost of locomotive fuel and its relative proportion to gross earnings and operating expenses, and also the average price per short ton of coal in the United States since 1899:

SUMMARY OF COST OF LOCOMOTIVE FUEL AND PROPORTION TO
EARNINGS AND EXPENSES OF AMERICAN RAILWAYS, 1909
TO 1899, WITH PRICE OF BITUMINOUS COAL PER TON
DURING THE SAME PERIOD.

Year	Miles of Line	Cost of Locomotive Fuel	Proportion to Operating Expenses	Proportion to Gross Earnings	Price of Coal at Mines per Ton*
1909.....	221,132	\$184,359,112	11.757	7.77	.....
1908.....					1.12
1907.....	227,454	200,261,975	11.471	7.74	1.14
1906.....	222,340	170,499,133	11.119	7.34	1.11
1905.....	216,973	156,429,245	11.278	7.51	1.06
1904.....	212,243	158,948,886	11.893	8.05	1.10
1903.....	205,313	146,509,031	11.675	7.70	1.24
1902.....	200,154	120,074,192	10.776	6.96	1.12
1901.....	195,561	104,926,568	10.602	6.61	1.05
1900.....	192,556	90,593,965	9.809	6.09	1.04
1899.....	187,534	77,187,344	9.478	5.88	.87

*These figures are from the latest report of the United States Geological Survey.

The significance of this table is that it cost the railways almost one-third more for fuel per dollar earned in 1909 than it did in 1899, the increase in the proportion of fuel cost to gross earnings having been 32%, due to the advance of 31% in the price of coal at the mines during that period.

The effect of the anthracite coal strike and the Commission's award of date March 18, 1903, upon the cost of bituminous coal is seen in the sharp advances in 1902 and 1903.

The railways have not escaped the advance in their cost of living due to the increased price of fuel any more than the public at large, and so far they have not been able to shift any portion of that cost, as manufacturers and shippers have done.

XII

THE SAFETY OF AMERICAN RAILWAYS

Never before in the history of railways has such a record for comparative safety been made as that recorded of American railways during the year ending June 30, 1909. Following its custom the Interstate Commerce Commission has published the report of accidents. It remains to set forth here the more remarkable record of safety.

OF THE 368 COMPANIES REPORTING TO THIS BUREAU, NO LESS THAN 347, OPERATING 159,657 MILES OF LINE AND CARRYING 570,-617,563 PASSENGERS, WENT THROUGH THE YEAR WITHOUT A SINGLE FATALITY TO A PASSENGER IN A TRAIN ACCIDENT.

Of the remaining 21 companies, no less than 10, operating 27,681 miles and carrying 185,447,507 passengers, only missed such perfect immunity by a single fatality each in accidents to trains. This leaves 11 roads whose misfortune it was to bear the burden of train accident fatalities to passengers during the year.

The invariable rule of the Bureau precludes the publication of the honor roll of safety. And it is well so, for it would lead to invidious comparisons, where, in such matters as accidents, all comparisons are as irrelevant as they are invidious.

But it may be stated that the roll of immunity includes roads in every section of the union, from Maine to California, several great systems operating over 7,000 miles of line each, as well as little branch lines of below ten miles of single track; lines operated with all the safety appliances known to twentieth century progress and lines operated under as primitive conditions as prevailed on this continent more than half a century ago.

THIS RECORD OF COMPLETE IMMUNITY, STRETCHING OVER 159, 657 MILES OF OPERATED LINE, REPRESENTS A MILEAGE NEARLY SEVEN TIMES THAT OF ALL BRITISH ROADS, AND EQUALS THE AGGREGATE OF ALL EUROPE, EXCLUDING RUSSIA BUT INCLUDING THE BRITISH ISLES.

What immunity to fatalities to passengers over such a vast mileage means may be partly realized from the fact that only twice in half a century has it occurred on the 23,000 miles of British railways, and never, to the writer's knowledge, so far as statistics reveal, on the railways of any of the great divisions of Europe. Certainly it has never occurred on the aggregate railways of Europe.

It would take seven consecutive years of immunity from fatalities to passengers in train accidents on British railways to equal this phenomenal record of American roads.

In presenting similar returns for 1908, it was said that "considering the myriad units of risk involved, the record for immunity from fatal accidents to passengers is without parallel in the history of railway operation." How that record has been not only equalled but surpassed is shown in the following statement for the last two years:

**SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH NO
PASSENGER WAS KILLED IN A TRAIN ACCIDENT
DURING THE YEARS 1908 AND 1909.**

	1909	1908
Number of operating companies.....	347	316
Mileage of these companies.....	159,657	124,050
Passengers carried.....	570,617,563	455,365,447
Passengers carried 1 mile.....	18,953,025,000	14,776,368,000
Tons of freight carried.....	1,116,877,052	916,123,410
Tons of freight carried 1 mile.....	151,974,495,000	121,589,399,000
Passengers killed in train accidents.....	None	None
Passengers injured in train accidents.....	2,585	2,695

This table proves that the area of perfect safety, so to speak, was extended over from 22% to 26% more units of risk in 1909 than in 1908, which already held the palm for immunity in train accident fatalities to passengers.

The figures given above as to passengers injured in train accidents are equally illuminating as to the safety of American railways, for they demonstrate that with the multiplication of risks in 1909 the number of injured was less by 4%. The fact that no passenger is killed in train accidents is more or less adventitious, but a reduction in the number injured testifies to a reduction in the opportunities for fatalities.

During the past ten years the average of passengers injured in train accidents on British railroads has been 580, which, considering the difference in the units of risk, is 100% higher than the above record for 159,657 miles of American railway in 1909.

The following table, which includes no less than six great systems of over 2,000 miles each, presents similar data in respect to the ten roads whose record for safety to passengers in train accidents is marred by a single fatality:

**SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH ONLY
ONE PASSENGER WAS KILLED IN A TRAIN ACCIDENT
DURING THE YEAR 1909.**

	1909
Number of operating companies	10
Mileage of these companies	27,681
Passengers carried	185,447,507
Passengers carried 1 mile	5,778,621,000
Tons of freight carried	213,086,612
Tons of freight carried 1 mile	40,177,881,000
Passengers killed in train accidents	10
Passengers injured in train accidents	778

These figures show a mileage of 4,481 miles greater than all the railways of the United Kingdom, approximately one-half the passenger mileage, and over three times the ton mileage, with only 10 passengers killed in train accidents, to an average of 20 on British railways during the past ten years.

Further analysis of the returns to the Bureau, since data along this line has been compiled, affords the following statement of the number of roads and their mileage that have records of entire immunity from fatalities to passengers in train accidents of from one up to six years:

**STATEMENT SHOWING NUMBER OF RAILWAYS AND MILEAGE ON
WHICH NO PASSENGER HAS BEEN KILLED IN A TRAIN
ACCIDENT, 1904 TO 1909.**

	Number of Companies	Miles of Line
Six consecutive years, 1904-1909	17	9,641
Five " " 1905-1909	95	44,894
Four " " 1906-1909	177	57,331
Three " " 1907-1909	228	69,713
Two " " 1908-1909	287	108,710
One year, 1909	347	159,657

Gratifying and remarkable as was the immunity from fatalities of the class under consideration in 1909, the fact that for a period of five years 95 American roads with a mileage practically double that of all British railways have carried hundreds of millions of passengers without a fatality to one of them is so at variance with the popular impression regarding the dangers of American railway travel as to seem little short of marvelous.

The impressive character of this showing will be better appreciated when it is understood that the immunity from fatalities in

train accidents represents consecutive years counting back from 1909. No road has been admitted to the list where the immunity has been interrupted by a single accident. With this fact in mind, the clean slate of the 17 roads for six years challenges admiration, especially as the Bureau's reports in 1904 covered less than two-fifths of the operated mileage of the United States.

RAILWAY ACCIDENTS IN 1909.

Having thus shown the gratifying immunity from fatalities to passengers in train accidents during the year 1909, and on 9,641 miles of line since 1904, it remains to present the reverse side of the picture, which is so invariably thrust forward in official documents. Accident Bulletin No. 32 of the Interstate Commerce Commission furnishes the following data as to the number killed and injured on the railroads of the United States during the last two fiscal years:

SUMMARY OF CASUALTIES TO PERSONS IN RAILWAY ACCIDENTS FOR THE YEARS ENDING JUNE 30, 1909 AND 1908.

Class of Accident	1909				1908			
	Passengers		Employees		Passengers		Employees	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Collisions.....	94	3,033	248	2,362	111	4,284	303	3,428
Derailments.....	37	2,717	227	1,448	54	3,057	260	2,065
Miscellaneous train accidents, including locomotive boiler explosions.....		115	45	1,067		89	79	1,325
Total train accidents...	131	5,865	520	4,877	165	7,430	642	6,818
Coupling or uncoupling.....			161	2,353			239	3,121
While doing other work about trains or while attending switches.....			93	14,315			206	15,991
Coming in contact with overhead bridges, structures at side of track, etc..	2	36	76	1,229	4	37	110	1,353
Falling from cars or engines or while getting on or off..	137	3,076	481	10,259	159	2,501	668	11,735
Other causes.....	65	3,139	1,125	18,771	78	2,677	1,493	17,326
Total (other than train accidents).....	204	6,251	1,936	46,927	241	5,215	2,716	49,526
Total (all classes).....	335	12,116	2,456	51,804	406	12,645	3,358	56,344
Totals in 1907:								
In train accidents.....	410	9,070	1,011	8,924				
In other than train accidents.....	237	4,527	3,342	53,765				
All classes of accidents...	647	13,597	4,353	62,689				

The same cause which accounted for the remarkable recession of railway casualties in 1908 was still operative in a more marked degree throughout 1909, as evidenced in the above table. Here is shown a reduction from 1907 of 68% in fatalities to passengers in train accidents and of nearly 50% in those to employes. Even in all classes of accidents the decrease is almost as striking. A drop from 647 to 335 in fatalities to passengers and from 4,353 to 2,456 in fatalities to employes, resulting from whatever cause, should be a matter for national congratulation and thanksgiving.

That the facts herein set forth should have no lesson for national authorities beyond moving them to appeal for additional control of safety appliances is nothing short of a national scandal. As for safety devices, the railways in 1907 were practically as well equipped as in 1909. The percentage operated under the protection of block signals was 27.1% in 1909 against 26.2% in 1907, a difference inappreciable as compared with the recorded difference in fatalities. The government inspectors reported the equipment in better condition in 1907 than for any previous year by fully 30%, and yet that was the worst year in the annals of railway accidents.

An English writer (H. Raynor Wilson), his vision unobscured by the propinquity of patent devices, has placed his finger on the true cause of the reduction in railway accidents in the United States in 1908 and 1909 when writing in "The Safety of British Railways" he says:

"Experience in America during the period of depression that has prevailed since the summer of 1907 shows that fewer accidents occur during such times. There are not so many goods trains, the men are less 'pushed,' they work fewer hours, and the careless and indifferent are weeded out."

But we do not have to go to England for a convincing analysis of the causes of the remarkable decrease in accidents on American railways in 1908 and 1909. In the presence of similar conditions Statistician Adams in his official report for 1894 penned the following:

"Another explanation may be suggested for this decrease in casualties to railway employes. The character of equipment used during the year covered by this report was undoubtedly of a higher grade than in previous years. A large number of old cars of abandoned type were destroyed during the year, while there was an increase in the better grades of cars equipped with train brakes and automatic couplers. This, however, is a suggestion merely, there being no statistical proof of any relation between a higher grade equipment and the decrease of accidents to employes. It is also probable, in view of the fact that liability to accident is increased by

the employment of the shiftless and unskilled, that the grade of labor was raised through the discharge of so large a number of employes. This latter suggestion finds support in the fact that the ratio of casualties in the Southern States, where the grade of labor is somewhat inferior, has for a series of years been higher than in the Northern and Eastern States."

With a continuation of similar conditions as to traffic and labor throughout 1895, the Official Statistician, having not yet accepted the theory that violation of rules, carelessness and negligence are amenable to patent appliances, emphasized the concluding suggestion of his 1894 report in these terms:

"From the above comparative statement it is clear that the year ending June 30, 1895, is more satisfactory, so far as accidents are concerned, than any previous year. Reference was made in last year's report to the fact that the marked reduction in the pay roll of the railways, by which the incompetent and inefficient were dropped from the railway service, and the consignment to the scrap heap of equipment worn out or out of date, were largely responsible for the greater safety in railway travel and railway employment shown by the statistics of the year. The result of raising the character of the railway service and grade of railway equipment is yet more marked during the present year, and to this must be added the fact that the demands upon the passenger service during the present year have been somewhat decreased. It is also worthy of suggestion, although the facts yet at command are not adequate for confident assertion, that the fitting of equipment with automatic devices is beginning to show beneficial results."

From that year to this the fitting of equipment with automatic devices has proceeded with uninterrupted despatch. Where in 1895 only 27.7% of it was equipped with train brakes and 31.3% with automatic couplers, in 1907 the Commission reported 94.4% equipped with train brakes and 99% with automatic couplers. In every form of mechanical safety device the railway equipment of 1907 was incomparably better than in 1895, and yet the number of fatal accidents to employes in 1907 exceeded those in 1895 seven to three and to passengers three and four-fifths to one. In the matter of deaths in coupling accidents alone are "beneficial results" traceable to automatic safety devices. The character of the men in the service, their automatic observance of regulations, intelligence and alert devotion to duty are the best preventives of railway accidents, and the conditions prevalent after the panics of 1893 and 1907 are conducive to these conditions.

It is not likely, however, that the American people will welcome experiences, even in homeopathic doses, such as we knew in 1904, as the cure for railway accidents. But from the lessons of

every depression, as read in the statistics of railway fatalities, the American people have a right to expect their representatives in federal and state legislatures to learn that the prevention of railway accidents rests on the intelligence, vigilance and experience of the man and not with the multiplication of devices. Automatic obedience to rules will prevent more accidents than all the safety devices that cumber the shelves of the Patent Office at Washington. Invention, however, is easier to the average American than plain everyday observance of rules. Besides the selling of devices to railways is a profitable business.

ACCIDENTS INCREASE IN 1909-10.

Accident Bulletin No. 33 for the first quarter of the current fiscal year shows the unfavorable turn in casualties always attendant on reviving business. Given in brief the figures are as follows:

CASUALTIES TO PERSONS, JULY, AUGUST AND SEPTEMBER, 1909.

	Killed	Injured
To passengers:		
From accidents to trains.....	56	2,325
By accidents from other causes.....	48	2,088
To employes:		
From accidents to trains.....	137	1,427
By accidents from other causes.....	611	13,401
Total classes.....	852	19,241
Corresponding quarter 1908.....	734	16,545

As this report goes to press, the Commission, through the Associated Press, has issued a summary of Accident Bulletin No. 34 which states that there were 1,073 persons (105 passengers and 969 employes) killed and 21,849 injured on the steam railways of the United States during the three months ending December 31, 1909.

This shows an increase over the corresponding quarter last year of 275 killed and 5,003 injured. For the same quarter in 1907 the killed were 1,092; in 1906, 1,430; and in 1905, 1,109. As the quarter ending December 31, 1909, saw railway traffic at its highest pressure, it shows an improvement over the records of 1907, '06 and '05.

The number injured is the highest ever recorded for three months, surpassing the quarter ending September 30, 1907, however, by only 126. But as explained elsewhere, "injuries" is too elastic a term for comparative statistics.

ACCIDENTS TO OTHER PERSONS.

Where the quarterly Bulletins of the Commission make no mention of the accidents to persons other than passengers and employes, the annual reports of the carriers supply the missing data as to "Other Persons." These include casualties at highway crossings, to trespassers, persons walking, standing or sleeping on the track, workmen in railway shops and all other accidents directly or indirectly connected with the transportation industry. Accidents to "Other Persons" cover over 60% of all fatalities charged to the railways and of these over 80% are to trespassers.

The returns to this Bureau show the following casualties to persons other than passengers and employes during the year ending June 30, 1909:

Class	Killed	Injured
Trespassers (including suicides)	4,919	5,697
Not trespassing	820	3,069
Total other persons	5,739	8,766

These figures warrant the estimate that the total number of trespassers and other persons killed and injured in the United States in 1909 through the operation of railways was approximately 5,978 and 9,132 respectively. This marks a decrease from 1908, but not nearly so great as in the case of passengers and employes.

FATALITIES IN RAILWAY ACCIDENTS SINCE 1888.

We are now enabled to present a complete statement of the fatalities connected with the transportation industry since the Commission began compiling casualty statistics in 1888. The figures in this summary are confined to fatalities, for the reason given by the Commission that it "is well known the term 'injury,' as used in statistics of this character, is elastic." As a matter of fact the terms injury and casualty are so individually or locally indefinite and variable as to have little or no statistical value.

PASSENGERS, EMPLOYES AND OTHER PERSONS KILLED IN RAILWAY
ACCIDENTS FROM 1888 TO 1908.

Year	Passengers	Employees	Other Persons		Total
			Tres- passers	Not Tres- passing	
1909.....	335	2,456	5,124	854	8,769
1908.....	406	3,358	5,560	940	10,264
1907.....	647	4,353	5,612	1,044	11,656
1906.....	359	3,929	5,381	949	10,618
1905.....	537	3,361	4,865	940	9,703
1904.....	441	3,632	5,105	868	10,046
1903.....	355	3,606	5,000	879	9,840
1902.....	345	2,969	4,403	871	8,588
1901.....	282	2,675	4,601	897	8,455
1900.....	249	2,550	4,346	660	7,865
1899.....	239	2,210	4,040	634	7,123
1898.....	221	1,958	4,063	617	6,859
1897.....	222	1,693	3,919	603	6,437
1896.....	181	1,861	3,811	595	6,448
1895.....	170	1,811	3,631	524	6,136
1894.....	324	1,823	3,720	580	6,447
1893.....	299	2,627	3,673	647	7,346
1892.....	376	2,554	3,603	614	7,147
1891.....	293	2,660	3,465	611	7,029
1890.....	286	2,451	3,062	536	6,335
1889.....	310	1,972	Not given	*3,541	5,823
1888.....	315	2,070		*2,897	5,282

*Includes trespassers.

To the most casual student this table illustrates how railway accidents increase and decline with periods of business activity and recession. The effect of the panic of 1893-94 is seen in the decrease in accidents in 1895 and 1896. The temporary slowing up in 1904 is reflected in fewer fatalities in 1905, and a drop of 11% in the business of 1908 was followed by a decreased death roll of 12% for that year and 25% in 1909.

RELATION OF ACCIDENTS TO PASSENGER TRAFFIC.

The relation of railway accidents to passenger travel is most accurately measured in the following statement of the number of passengers carried one mile to one killed in train accidents during the years for which these statistics have been compiled:

PASSENGERS CARRIED ONE MILE TO ONE KILLED.

Year	Passengers Killed in Train Accidents	Passengers Carried One Mile	Passengers Carried One Mile to One Killed
1909.....	131(a)	29,452,000,000	288,745,100
1908.....	165(b)	29,082,836,944	196,505,648
1907.....	410	27,718,554,030	72,802,600
1906.....	182	25,167,240,831	183,702,488
1905.....	350	23,800,149,436	68,000,427
1904.....	270	21,923,213,536	81,197,087
1903.....	164	20,915,763,881	127,535,745
1902.....	170	19,689,937,620	115,823,162
1901.....	110	17,353,588,444	157,759,894
1900.....	93	16,038,076,200	172,463,183
1899.....	83	14,591,327,613	175,799,127
1898.....	74	13,379,930,004	180,809,864
1897.....	96	12,256,939,647	127,676,454
1896.....	41	13,049,007,233	318,268,469
1895.....	30	12,188,446,271	406,281,542
1894.....	162	14,289,445,893	88,206,456
1893.....	100	14,229,101,084	142,291,010
1892.....	195	13,362,898,299	68,522,555
1891.....	110	12,844,243,881	116,765,853
1890.....	113	11,847,785,617	104,847,660
1889.....	161	11,553,820,445	71,762,859

(a) Of these only 102 were passengers in the ordinary sense of the term.

(b) Of these only 148 were passengers in the ordinary sense of the term.

The student has to go back to the years of continued business paralysis, 1895 and 1896, to find any record of immunity to passengers from fatalities in train accidents at all comparable with the conditions that prevailed in 1909.

DECREASED HAZARD TO TRAIN CREWS.

Never in the history of American railways has the occupation of the men directly engaged in the operation of trains been as free from fatalities as during the year 1909. This is proved by the following statement showing the number of trainmen killed in all descriptions of accidents since the figures have been compiled, with the ratio to the number employed:

SUMMARY SHOWING NUMBER OF TRAINMEN KILLED IN RAILWAY
ACCIDENTS 1889 TO 1909, WITH RATIO TO NUMBER
EMPLOYED.

	Trainmen	Trainmen in Yards	Yard Trainmen Switching Crews	All Trainmen	Number of Trainmen for One Killed
1889.....	1,179	.....	.....	1,179	117
1890.....	1,459	.....	.....	1,459	105
1891.....	1,533	.....	.....	1,533	104
1892.....	1,503	.....	.....	1,503	113
1893.....	1,567	.....	.....	1,567	115
1894.....	1,029	.....	.....	1,029	156
1895.....	1,017	.....	.....	1,017	155
1896.....	1,073	.....	.....	1,073	152
1897.....	976	.....	.....	976	165
1898.....	1,141	.....	.....	1,141	150
1899.....	1,155	.....	.....	1,155	155
1900.....	1,396	.....	.....	1,396	137
1901.....	1,537	.....	.....	1,537	136
1902.....	1,507	.....	.....	1,507	135
1903.....	2,021	.....	.....	2,021	123
1904.....	1,181	487	488	2,156	120
1905.....	1,155	386	493	2,034	133
1906.....	1,360	400	575	2,335	124
1907.....	1,507	459	630	2,596	125
1908.....	1,097	362	496	1,955	150
1909.....	789	270	313	1,372	202

The figures of the Interstate Commerce Commission have only made the division of trainmen shown above since 1904. Here again the last column proves the relation of accidents to the ebb and flow of traffic.

FREIGHT TRAFFIC AND ACCIDENTS.

The preponderating part played by the immense freight traffic of American railways as a cause of accidents is shown in the following analysis of the sixty "prominent collisions" described in the Commission's quarterly Accident Bulletins for the year 1909:

Kind of Train in Accident	Number of Collisions	Killed	Injured
Passenger and passenger.....	8	30	225
Freight and passenger.....	18	68	374
Freight and freight.....	34	47	91
Total.....	60	145	690

Here it will be observed freight trains were involved in 86.6% of the prominent collisions of the year and shared in responsibility for 79.3% of the fatalities. The proportion of injured in accidents to freight trains is not so great for the obvious reason that the number of persons exposed in collisions involving only freight trains is generally limited to train crews.

CAUSES OF TRAIN ACCIDENTS.

An examination of the causes given for the prominent collisions and derailments in the Accident Bulletins of the Commission since the passage of the Act of March 3, 1901, requiring the railway companies to make full monthly reports of all accidents affords the following general statement:

Cause	Number of Accidents
Negligence, error or forgetfulness of some member of train crew	241
Recklessness, carelessness, overlooking or disregarding orders or taking chances	233
Disobedience	53
Incompetence or inexperience	20
Defect of equipment, tires, wheels, etc.	64
Defect of roadway	24
Malicious acts	27
Misadventure, washouts, landslides, cyclones, etc.	91
Undiscovered	41
Total	794

Among the prominent derailments charged against the railways in the Bulletin for April, May and June, 1909, is the following, resulting in one killed and three injured.

"Automobile running on track, derailed by running over a dog, one guest killed."

Through the inclusion in these Bulletins of accidents on trolley lines, their value as records of railway accidents is being greatly impaired. Without any information as to the number of passengers carried by the electric cars it is impossible to arrive at an accurate idea of the relation of accidents to traffic, and without this the mere record of accidents has little information value.

ACCIDENTS ON BRITISH RAILWAYS.

For a second time in their history, in the year ending December 31, 1908, British railways went through a twelvemonth without killing a single passenger in a train accident, thus paralleling their

record of 1901 in this respect. In the matter of passengers injured, the year 1908 showed a remarkable improvement, not only over 1901 but over any other year in the history of British railways. When it comes to the totals of casualties, however, 1908 shows little variation from the average record.

The following table shows the total number of persons killed and injured in the working of British railways, as reported to the Board of Trade for the calendar year 1908 as compared with 1901:

Class	1908		1901	
	Killed	Injured	Killed	Injured
Passengers:				
In accidents to trains		283		476
By accidents from other causes	107	3,105	135	2,269
Total passengers	107	3,388	135	2,745
Employees:				
In accidents to trains	6	164	8	156
By accidents from other causes	426	24,017	568	14,522
Total employees	432	24,181	576	14,678
Other persons:				
Accidents to trains		7	3	5
While passing over railways at level crossings	51	44	55	26
While trespassing on line (including suicides)	479	118	426	171
Not coming under above classification	59	747	82	750
Total other persons	589	916	566	952
Grand total all classes, 1908	1,128	28,485	1,277	18,375
" " " " 1907	1,211	25,975		
" " " " 1906	1,252	20,444		
" " " " 1905	1,180	18,236		
" " " " 1904	1,158	18,802		
" " " " 1903	1,262	18,557		
" " " " 1902	1,171	17,814		
" " " " 1901	1,277	18,375		
" " " " 1900	1,325	19,572		
" " " " 1899	1,340	19,155		
Total, ten years	12,294	205,415		

As one year of traffic on American railways approximates ten years on British railways, the above totals for ten years on the latter may be compared with 8769 killed and 73,052 injured on the former last year, or with 11,839 killed and 111,016 injured in 1907, the darkest year in the annals of American railway accidents.

Attention is asked to the apparently startling increase in injuries on British railways since 1905. The increase is absolutely fictitious, having resulted from "a change in the definition of a reportable accident," and not from any greater hazard in the working of British roads. This confirms the objection, expressed in the report of the British Board of Trade in 1903, to any changes in the form of tables extending over a long series of years that "admit of comparisons, which any change of form would invalidate if not destroy."

It will be perceived that the mere change in the definition of what constitutes a reportable accident increased the number of injuries reported against British railways fully 50%. This justifies the writer's view that comparisons of injuries in railway accidents are of little value. Even the same injury does not affect two persons in the same degree. One "hollers" and cries for a doctor where the other whistles and goes on with his work.

The inquiries of the Board of Trade into the causes of British railway accidents in 1908 confirm former findings that, exclusive of train accidents, in the case of passengers "they mostly arise from carelessness of the passengers themselves," and the same is true of the vast majority of accidents to employees.

OVERWORK AND RAILWAY ACCIDENTS.

At last the statistics of the British Board of Trade furnish what well nigh amounts to demonstration that long hours play very little part as an actual cause of railway accidents. Under the statute the Board requires reports of all instances of periods of duty in excess of twelve hours worked on British railways. For the month of October, 1908, the returns show 31,052 excess hours worked out of 2,773,891; and for October, 1909, 24,486 out of 2,695,036, or an excess of 1.12% in 1908 and .92% in 1909.

Now, out of 861 accidents investigated in 1908, only 16, or 1.85%, occurred to men working in excess of 12 hours; and out of 804 investigated in 1909 only 9, or 1.12%. This bears out the opinion of a high English official, that experience "does not show any close connection between long hours and accidents."

The following statement shows the relation of accidents to the hours the persons involved have been on duty on British railways for a period of five years:

HOURS WHEN BRITISH ACCIDENTS OCCUR.

Three months to	Off duty	Hours on Duty when Accidents Occurred																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Sept. 30, 1908.....	1	20	18	19	17	15	23	19	11	11	17	14	17	3	0	0	1	0
Dec. 31, 1908.....	5	12	22	34	14	23	23	16	14	19	13	11	8	5	0	0	0	0
March 31, 1909.....	4	14	16	29	28	16	17	18	19	11	12	15	7	0	0	0	0	0
June 30, 1909.....	1	15	16	10	19	15	14	15	16	24	12	11	5	0	0	0	0	0
Year 1909.....	11	61	72	92	78	69	77	68	60	65	54	51	37	8	0	0	1	0
Year 1908.....	6	60	103	83	85	77	81	72	70	63	57	53	35	8	8	0	0	0
Year 1907.....	1	70	86	78	78	71	64	59	48	68	62	43	35	14	12	5	3	1
Year 1906.....	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	0	2
Year 1905.....	3	52	74	65	54	71	66	59	48	53	56	41	37	7	3	3	0	1
Five years.....	27	295	399	388	381	351	369	326	296	320	290	230	183	44	27	11	4	4

It will be observed that out of these 3,945 accidents investigated and reported on by British inspectors during the years 1905 to 1909, inclusive, a majority happened during the first half of the twelve hours for which the men were booked and 2.28% when they were working overtime. In no instance was the accident attributed to long hours.

RAILWAY ACCIDENTS IN EUROPE.

Excluding the returns of injured, for the reason that no two countries have a common definition of a reportable injury, the accidents on European railways, according to the latest reports, resulted in the following fatalities.

KILLED IN EUROPEAN RAILWAY ACCIDENTS.
(Total mileage represented 182,459.)

Country	Year	Passengers	Employees	Other Persons	Total	Preceding Year
United Kingdom.....	1908	107	432	587	1,128	1,211
Germany.....	1908	105	604	644	1,353	1,558
Russia in Europe.....	1905	231	478	1,149	1,858	1,632
France.....	1907	*36	322	†301	659	627
Austria.....	1907	11	147	145	303	213
Hungary.....	1907	32	138	172	343	319
Italy.....	1907-8	‡42	105	115	262	277
Spain.....	1907	25	64	213	302	219
Portugal.....	1904				55	
Sweden.....	1906	10	45	57	112	105
Norway.....	1908	1	4	6	11	9
Denmark.....	1907-8	‡1	20	9	30	22
Belgium.....	1907	4	72	70	146	125
Holland.....	1907	3	18	25	46	60
Switzerland.....	1907	14	45	36	95	78
Roumania.....	1907-8	8	42	50	100	103
Totals.....		630	2,536	3,580	6,803	6,595

*Train accidents only; other accidents to passengers included under "Other Persons."

†Excluding suicides.

‡Statistics cover State railways only.

These figures, representing a European mileage of 182,459, may be compared with those of the United States in 1897 when it had 183,284 miles of line and an accident record of 222 fatalities to passengers, 1,693 to employees and 4,522 to other persons; or even with the American record for 1909, when with a mileage 27% greater the record stood 335 fatalities to passengers, 2,456 to employees and 5,978 to other persons. The excess of fatalities to other persons in this country is due to the notorious indifference to danger and law of all classes of citizens in using railway right of way as a common thoroughfare for adults and playground for children. Despite the elevation of the tracks in Chicago, the writer has seen scores of youngsters scarcely able to walk playing on those raised tracks and laughing at the locomotives as they went shrieking by.

In all comparisons of accidents on American railways with those on foreign roads, it should be remembered that our excess of mileage and freight traffic more than balance their density of passenger traffic and that nowhere else on earth is railway right of way common to foolhardy pedestrians and creeping children.

The Railroad Commission of Indiana is to be commended for its efforts to enlist public sentiment against trespassing on railway tracks.

**SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH ONLY
ONE PASSENGER WAS KILLED IN A TRAIN ACCIDENT
DURING THE YEAR 1909.**

	1909
Number of operating companies.....	10
Mileage of these companies.....	27,681
Passengers carried.....	185,447,507
Passengers carried 1 mile.....	5,778,621,000
Tons of freight carried.....	213,086,612
Tons of freight carried 1 mile.....	40,177,881,000
Passengers killed in train accidents.....	10
Passengers injured in train accidents.....	778

These figures show a mileage of 4,481 miles greater than all the railways of the United Kingdom, approximately one-half the passenger mileage, and over three times the ton mileage, with only 10 passengers killed in train accidents, to an average of 20 on British railways during the past ten years.

Further analysis of the returns to the Bureau, since data along this line has been compiled, affords the following statement of the number of roads and their mileage that have records of entire immunity from fatalities to passengers in train accidents of from one up to six years:

**STATEMENT SHOWING NUMBER OF RAILWAYS AND MILEAGE ON
WHICH NO PASSENGER HAS BEEN KILLED IN A TRAIN
ACCIDENT, 1904 TO 1909.**

	Number of Companies	Miles of Line
Six consecutive years, 1904-1909.....	17	9,641
Five " " 1905-1909.....	95	44,894
Four " " 1906-1909.....	177	57,331
Three " " 1907-1909.....	228	69,713
Two " " 1908-1909.....	287	108,710
One year, 1909.....	347	159,657

Gratifying and remarkable as was the immunity from fatalities of the class under consideration in 1909, the fact that for a period of five years 95 American roads with a mileage practically double that of all British railways have carried hundreds of millions of passengers without a fatality to one of them is so at variance with the popular impression regarding the dangers of American railway travel as to seem little short of marvelous.

The impressive character of this showing will be better appreciated when it is understood that the immunity from fatalities in

train accidents represents consecutive years counting back from 1909. No road has been admitted to the list where the immunity has been interrupted by a single accident. With this fact in mind, the clean slate of the 17 roads for six years challenges admiration, especially as the Bureau's reports in 1904 covered less than two-fifths of the operated mileage of the United States.

RAILWAY ACCIDENTS IN 1909.

Having thus shown the gratifying immunity from fatalities to passengers in train accidents during the year 1909, and on 9,641 miles of line since 1904, it remains to present the reverse side of the picture, which is so invariably thrust forward in official documents. Accident Bulletin No. 32 of the Interstate Commerce Commission furnishes the following data as to the number killed and injured on the railroads of the United States during the last two fiscal years:

SUMMARY OF CASUALTIES TO PERSONS IN RAILWAY ACCIDENTS FOR THE YEARS ENDING JUNE 30, 1909 AND 1908.

Class of Accident	1909				1908			
	Passengers		Employees		Passengers		Employees	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Collisions.....	94	3,033	248	2,362	111	4,284	303	3,428
Deraillments.....	37	2,717	227	1,448	54	3,057	260	2,065
Miscellaneous train accidents, including locomotive boiler explosions.....		115	45	1,067		89	79	1,325
Total train accidents.....	131	5,865	520	4,877	165	7,430	642	6,818
Coupling or uncoupling.....			161	2,353			239	3,121
While doing other work about trains or while attending switches.....			93	14,315			206	15,991
Coming in contact with overhead bridges, structures at side of track, etc..	2	36	76	1,229	4	37	110	1,353
Falling from cars or engines or while getting on or off..	137	3,076	481	10,259	159	2,501	668	11,735
Other causes.....	65	3,139	1,125	18,771	78	2,677	1,493	17,326
Total (other than train accidents).....	204	6,251	1,936	46,927	241	5,215	2,716	49,526
Total (all classes).....	335	12,116	2,456	51,804	406	12,645	3,358	56,344
Totals in 1907:								
In train accidents.....	410	9,070	1,011	8,924				
In other than train accidents.....	237	4,527	3,342	53,765				
All classes of accidents.....	647	13,597	4,353	62,689				

XV STATISTICS OF

In the following review of the mileage and traffic statistics of the principal divisions of Europe and other countries, the information has been derived from the latest official sources wherever available, and where estimates have been resorted to as noted they have been

Country	Year	Miles Covered by Capitalization	Capitalisation or Cost of Construction	Passenger Revenues	Freight Revenues	Other Revenues	Total Earnings
United Kingdom..	1908	23,205	\$ 6,382,296,742	\$207,539,004	\$286,786,249	\$89,560,115	\$583,885,371
German Empire..	1908	35,558	3,903,848,400	178,100,400	412,635,760	56,715,200	647,451,360
France.....	1907	24,817	3,455,436,000	145,355,448	176,664,215	6,421,010	323,440,673
Russia in Europe..	1905	31,545	†3,170,876,360	58,813,500	221,967,500	39,678,500	320,459,500
Austria.....	1907	13,427	1,515,576,800	41,716,800	122,214,200	5,692,800	169,628,800
Hungary.....	1907	11,769	741,586,200	20,836,800	54,650,400	3,327,000	78,814,200
Italy*.....	1907-8	8,762	†1,091,608,000	31,149,888	51,266,976	6,929,979	89,346,841
Spain.....	1905	8,432	649,919,610	16,215,866	34,694,555	6,190,271	57,100,692
Portugal.....	1905	1,425	162,385,280	4,014,196	5,322,875	423,936	9,761,000
Sweden.....	1906	7,938	267,408,450	10,665,270	21,051,360	815,670	32,572,300
Norway.....	1908	1,608	61,841,610	2,253,420	3,029,920	108,810	5,392,150
Denmark*.....	1907-8	1,191	59,806,620	5,111,910	5,266,350	680,400	11,058,660
Belgium.....	1907	2,871	\$451,592,980	18,340,790	38,532,450	858,271	89,731,511
Holland.....	1907	2,225	191,821,000	10,978,400	10,664,400	1,300,000	22,942,800
Switzerland.....	1907	2,740	303,426,747	16,222,422	21,204,331	1,677,556	39,114,310
Roumania.....	1907-8	1,979	183,492,074	5,089,191	10,269,530	629,373	15,988,094
Canada.....	1909	24,104	1,608,963,337	39,073,488	95,714,783	10,268,065	145,056,336
Argentina.....	1907	13,690	820,433,280	19,853,760	56,597,760	7,578,240	83,029,760
Japan*.....	1908	3,982	190,173,728	18,786,895	14,651,808	1,448,881	34,887,584
British India.....	1908	30,809	1,336,005,760	55,132,160	84,225,280	4,088,640	143,446,080
New South Wales..	1909	3,623	231,870,440	8,380,744	14,437,981	1,669,826	24,488,551
Total.....		255,700	\$26,780,369,418	\$913,630,350	\$1,741,848,683	\$246,062,543	\$2,927,596,573
United States....	1908	230,494	α12,840,091,462	566,832,746	1,655,419,108	171,554,135	2,393,805,989

*State only.

†Including Siberian.

αExclusive of switching and terminal companies (1,626 miles).

computed from ascertained facts.

From the data here furnished it is possible to arrive at a close approximation of the passenger and freight rates in the countries named. The average passenger journey and freight haul in the United States is nearly twice as long as the average for the rest of

FOREIGN RAILWAYS

the world. In comparing net results it should be remembered that rentals and taxes should be deducted from the American figures.

For further details of the railways of Canada, the United Kingdom and the German Empire, for which complete statistics are avail-

Operating Expenses	Per Cent Expense to Revenue	Passengers Carried	Average Journey Miles	Freight Tons Carried	Average Haul (Miles)	Per Cent Net Revenues to Capital	Country.
\$372,103,990	63.7	1,725,631,620	7.8	491,595,056	25.0	3.32	United Kingdom
476,290,080	73.6	1,361,655,150	14.1	461,296,759	61.6	4.51	German Empire
183,444,503	55.9	474,335,306	19.9	156,504,353	78.8	4.18	France
216,987,500	67.8	116,441,000	73.2	156,129,875	151.1	3.73	Russia in Europe
120,103,800	70.8	223,717,302	19.1	151,941,132	53.7	3.27	Austria
53,309,000	67.6	107,171,000	21.4	61,483,000	69.5	3.6	Hungary
73,735,071	82.6	64,276,501	25.0¶	32,635,763	66.0¶	1.4	*Italy
27,750,936	48.6	41,846,249	26.0¶	22,662,548	69.4	4.5	Spain
4,426,236	45.3	13,446,043	20.0¶	3,775,559	54.0¶	3.3	Portugal
21,624,840	66.3	46,452,445	16.8	31,961,244	43.4	4.24	Sweden
3,727,620	69.1	10,679,732	15.5	4,501,455	35.4	2.55	Norway
9,344,430	84.5	20,818,639	21.7	4,726,757	55.1	2.92	*Denmark
38,428,809	64.4	181,216,314	14.0	72,494,073	43.5	4.72	Belgium
19,174,400	83.6	42,319,000	18.4	15,924,600	53.8	1.93	Holland
26,311,883	67.3	97,752,465	12.8	17,411,711	69.5	3.7	Switzerland
9,587,468	60.0	8,193,037	42.2	6,796,315	55.9	3.54	Roumania
104,600,082	72.1	32,683,309	62.0	66,842,258	197.0	2.51	Canada
56,198,080	67.7	41,911,512	25.2	27,933,828	115.9	3.95	Argentina
17,875,971	51.2	101,115,739	23.3	18,312,223	78.7	8.9	*Japan
86,408,000	60.2	321,169,000	37.7	62,398,000	159.1	4.33	British India
14,380,252	58.7	52,051,556	11.1	9,298,929	68.4	4.36	New South Wales
\$1,935,812,951	66.1	5,084,882,919	16.52	1,876,625,438	66.7	3.71	.....Total
1,669,547,876	69.75	890,009,574	32.66	1,532,981,790	142.5	4.17	....United States

†1906-7.

§State only, 2,543 miles.

¶Estimated.

able, the reader is referred to succeeding pages.

Here the writer would acknowledge the courtesy of the Railway Department of Canada for advance copies of the Dominion railway statistics for 1909.

RAILWAYS OF CANADA.

STATISTICS OF THE RAILWAYS OF THE DOMINION FOR THE
YEARS ENDING JUNE 30, 1907, 1908 AND 1909.

	1907	1908	1909
Miles of line operated.....	22,608	22,966	24,104
Second track.....	1,096	1,211	1,464
Yard track and sidings.....	4,092	4,546	4,761
All tracks.....	27,796	28,723	30,329
Capital cost:			
Stock.....	\$588,563,591	\$607,425,349	\$647,534,647
Funded debt.....	583,369,217	631,869,664	660,946,769
Government railways.....	100,958,402	109,423,104	111,545,903
Subsidies.....	162,017,157	166,291,482	188,963,337
Total capital cost.....	\$1,434,908,367	\$1,515,009,599	\$1,608,990,656
Per mile of line.....	63,910	65,968	66,752
Passenger traffic:			
Passengers carried.....	32,137,319	34,044,992	32,683,309
Passengers carried 1 mile.....	2,049,549,813	2,081,960,864	2,033,001,225
Average journey (miles).....	64	61	62
Average passengers per train.....	56	54	51
Mileage of passenger trains.....	30,220,461	31,950,349	32,295,730
Mileage of mixed trains.....	5,971,414	6,210,807	7,061,580
Receipts from passengers.....	\$39,184,437	\$39,992,503	\$39,073,488
Receipts per passenger mile (cents).....	1.911	1.920	1.921
Freight traffic:			
Tons carried.....	56,497,885	63,019,900	66,842,258
Tons carried 1 mile.....	11,687,711,830	12,961,512,519	12,061,512,519
Average haul (miles).....	183	206	197
Freight train mileage.....	38,923,890	40,476,370	40,304,906
Average tons per train.....	260	278	278
Receipts from freight.....	\$94,995,087	\$93,746,655	\$95,714,783
Receipts per ton mile (mills).....	8.12	7.23	7.27
Miscellaneous receipts.....	\$12,558,689	\$13,179,155	\$10,268,065
Total receipts.....	146,738,214	146,918,313	145,056,336
Expenses of operation:			
Way and structures.....	\$20,887,092	\$20,778,610	\$21,153,274
Maintenance of equipment.....	21,666,373	20,273,626	21,510,303
Conducting transportation.....	57,325,543	62,486,270	54,284,587
General expenses.....	3,869,664	3,765,636	3,853,094
Traffic expenses.....			3,798,824
Total expenses.....	\$103,748,672	\$107,304,142	\$104,600,082
Ratio to earnings.....	70.72%	73.04%	72.11%
Net receipts.....	\$42,989,552	\$39,614,171	\$40,456,251
Percentage to capital cost.....	3.00%	2.61%	2.51%
Gross receipts per mile.....	\$6,535	\$6,398	\$6,018
Gross expenses per mile.....	4,621	4,672	4,339
Number of employes.....	124,012	106,404	125,195
Compensation.....	\$58,719,493	\$60,376,607	\$63,216,662
Proportion of gross earnings.....	40.02%	41.10%	43.58%
Proportion of operating expenses.....	56.61%	56.27%	60.43%
Average per employe per year.....	\$473	\$569	\$505

RAILWAYS OF THE UNITED KINGDOM.
STATISTICS OF MILEAGE, CAPITALIZATION, AND TRAFFIC FOR
THE YEARS 1907 AND 1908.

	1907	1908
Length of railways:		
Double track or more (miles).....	12,845	12,926
Single track.....	10,263	10,279
Total length of line.....	23,108	23,205
Total length, all tracks, sidings, etc.....	53,158	53,669
Total capitalisation (paid up).....	\$6,302,099,773	\$6,382,296,742
Capitalization per mile of line.....	272,723	275,040
Passenger traffic:		
Passengers carried.....	1,259,481,000	1,278,115,000
Season ticket journeys.....	445,101,956	447,516,620
Passengers carried one mile.....	13,295,747,058	13,459,926,636
Average journey (miles).....	7.8	7.8
Receipts from passengers.....	\$205,036,740	\$207,539,004
Average receipts per passenger per mile (cents).....	1.54	1.542
Mail and other passenger train receipts.....	\$43,213,632	\$44,067,043
Freight traffic:		
Minerals, tons carried.....	407,602,177	388,424,541
General merchandise.....	108,284,939	103,170,515
Total freight, tons.....	515,887,116	491,595,056
Tons carried one mile.....	12,897,177,900	12,289,876,400
Average haul (miles).....	25	25
Receipts from freight.....	\$298,058,610	\$286,786,249
Average receipts per ton mile (cents).....	2.31	2.333
Miscellaneous receipts.....	\$45,634,648	\$45,493,075
Total receipts.....	\$591,943,630	\$583,885,371
Expenses of operation.....	373,085,840	372,103,990
Ratio of expenses to earnings.....	63.0	63.75
Net receipts.....	\$218,857,790	
Percentage to total paid-up capital.....	3.47	
Gross receipts per mile.....	\$25,616	\$25,162
Gross expenses per mile.....	16,165	16,035
Number of employes.....	621,341	*621,341
Total compensation.....	\$158,116,560	\$156,348,915
Proportion of gross earnings.....	26.7	26.78
Proportion of operating expenses.....	42.4	42.02
Average per employe per year.....	\$254.47	\$251.78

*No enumeration of employes has been made since 1907, the last preceding, in 1904, gave a total of 581,664.

RAILWAYS OF GERMANY.
STATISTICS OF MILEAGE, COST OF CONSTRUCTION, AND TRAFFIC
FOR THE YEARS 1906, 1907 AND 1908.

	1906	1907	1908
Length of State railways (miles).....	32,050	32,367	32,922
Length of private railways.....	2,513	2,613	2,636
Total.....	34,563	34,980	35,558
Cost of construction.....	\$3,613,493,706	\$3,767,220,777	\$3,903,848,400
Cost per mile.....	104,548	107,694	109,788
Passenger traffic:			
Passengers carried.....	1,209,224,072	1,294,881,923	1,361,655,150
Passengers carried (one mile).....	17,189,336,940	18,372,644,327	19,202,935,120
Average journey (miles).....	14.21	14.18	14.10
Receipts from passengers.....	\$170,165,002	\$172,339,593	\$178,100,400
Receipts per passenger per mile (cents).....	0.99	0.94	0.93
Freight traffic:			
Fast freight and express:			
Tons carried.....	3,791,769	3,935,538	4,013,970
Tons carried 1 mile.....	265,115,720	272,898,271	269,726,040
Average haul (miles).....	69.91	69.34	66.96
Receipts from same.....	\$16,924,080	\$17,295,969	\$17,015,040
Receipts per ton mile (cents).....	6.38	6.34	6.32
All freight:			
Tons carried.....	455,144,382	484,147,325	461,296,759
Tons carried one mile.....	28,118,620,680	29,702,981,149	29,420,680,340
Average haul (miles).....	61.78	61.35	61.60
Receipts from freight.....	\$397,580,738	\$418,021,052	\$412,635,760
Receipts per ton mile (cents).....	1.41	1.41	1.42
Miscellaneous receipts.....	\$63,151,060	\$68,413,909	\$56,715,200
Total receipts.....	\$630,796,800	\$658,774,554	\$647,451,503
Expenses of operation.....	407,174,400	454,610,032	476,290,080
Ratio expenses to earnings.....	64.5	69.1	73.6
Net receipts.....	\$223,622,400	\$204,645,522	\$171,261,040
Percentage on cost of construction.....	6.18	5.42	4.51
Gross receipts per mile.....	\$18,251	\$18,833	\$28,173
Gross expenses per mile.....	11,780	12,996	13,489
Number of employees.....	648,437	695,557	699,155
Total compensation.....	\$219,390,932	\$245,389,859	\$259,606,560
Proportion of gross earnings.....	34.78	37.25	40.10
Proportion of operating expenses.....	53.88	53.98	54.50
Average per employe per year.....	\$338.35	\$352.82	\$371.00

Mark the increased capital cost per mile and in proportion of wages to earnings, and the increased ratio of net earnings to cost of construction. Then figure how long it will take at this rate before the German people are taxed to support their railways or by increased rates because the railways have been run for politics and not for the people.

XVI

GROWTH OF RAILWAYS

In three-quarters of a century American railways, from small beginnings in Pennsylvania in 1827, Maryland in 1828, South Carolina in 1830, and New York and Massachusetts in 1831, show the following remarkable growth by decades:

PROGRESS OF RAILWAYS IN THE UNITED STATES SINCE 1835.

States	1835	1840	1850	1860	1870	1880	1890	1900	1909 Incom- plete
Alabama	46	46	75	743	1,429	1,851	3,148	4,219	5,037
Arkansas				38	256	896	2,113	3,341	4,883
California				23	925	2,220	4,148	5,744	6,835
Colorado					157	1,531	4,154	4,587	5,295
Connecticut		102	402	601	742	954	1,007	1,023	1,015
Delaware	16	39	39	127	224	280	328	346	342
Florida			21	402	446	530	2,390	3,272	4,010
Georgia		185	643	1,420	1,845	2,535	4,105	5,639	6,868
Idaho						220	941	1,261	1,763
Illinois			111	2,799	4,823	7,955	9,843	10,997	13,216
Indiana			228	2,163	3,177	5,454	5,891	6,469	7,774
Iowa				655	2,683	5,235	8,347	9,180	9,923
Kansas					1,501	3,439	8,806	8,719	9,125
Kentucky	15	28	78	534	1,017	1,598	2,694	3,059	3,484
Louisiana	40	40	80	335	479	633	1,658	2,824	4,737
Maine		11	245	472	786	1,013	1,313	1,915	2,150
Maryland and D.C.	117	213	259	386	671	1,012	1,168	1,407	1,468
Massachusetts	113	301	1,035	1,264	1,480	1,893	2,094	2,118	2,126
Michigan		50	342	779	1,638	3,931	6,789	8,193	8,976
Minnesota					1,072	3,108	5,466	6,942	8,285
Mississippi			75	862	990	1,183	2,292	2,919	4,169
Missouri				817	2,000	4,011	5,897	6,867	8,200
Montana						48	2,181	3,010	3,537
Nebraska					1,812	2,000	5,274	5,684	6,099
Nevada					593	769	925	909	1,699
New Hampshire		53	467	661	736	1,015	1,133	1,239	1,248
New Jersey	99	186	206	560	1,125	1,701	2,034	2,237	2,302
New York	104	374	1,361	2,682	3,928	6,019	7,462	8,121	8,504
North Carolina		53	154	937	1,178	1,499	2,904	3,808	4,476
North Dakota					35	635	1,940	2,731	4,026
Ohio		30	575	2,946	3,538	5,912	7,719	8,774	9,274
Oklahoma						275	1,213	2,150	5,572
Oregon					159	582	1,269	1,723	1,939
Pennsylvania	318	754	1,240	2,598	4,656	6,243	8,307	10,277	11,357
Rhode Island		50	68	108	136	210	212	212	212
South Carolina	137	137	289	973	1,139	1,429	2,096	2,795	3,324
South Dakota					30	630	2,485	2,850	3,703
Tennessee				1,253	1,492	1,824	2,710	3,124	3,761
Texas				307	711	3,293	7,911	9,873	12,987
Utah					257	770	1,090	1,547	1,986
Vermont			290	554	614	912	913	1,012	1,094
Virginia	93	147	384	1,379	1,486	1,826	3,142	3,729	4,187
Washington						274	1,699	2,890	3,806
West Virginia					387	694	1,306	2,198	3,355
Wisconsin			20	905	1,525	3,130	5,468	6,496	7,626
Wyoming						472	941	1,228	1,526
Arizona						384	1,061	1,511	1,930
New Mexico						643	1,284	1,752	2,967
Total	1,098	2,818	9,021	30,635	52,922	93,671	159,271	192,940	.....

The most striking feature of this statement is the number of states devoid of railway mileage previous to 1870, which since then the railways have converted into mighty commonwealths whose resources have been multiplied "some thirty fold, some sixty and some an hundred". And those to which the railways have made the greatest prosperity possible are the states whose politicians today are trying the hardest to muzzle the ox that treads out the corn for their people.

GROWTH OF RAILWAYS OF THE WORLD.

In the following table is given the mileage of the principal countries in the world from the earliest date available to the latest.

Country	Miles of Road Completed								
	Opened	1840	1850	1860	1870	1880	1889	1899	1909 †
Great Britain	1825	1,857	6,621	10,433	15,537	17,933	19,943	21,666	23,205
United States	1827	2,818	9,021	30,626	52,922	93,296	160,544	.....	234,182
Canada	1836	16	66	2,065	2,617	7,194	12,585	17,250	24,104
France	1828	.....	1,714	5,700	11,142	16,275	21,899	26,229	29,364
Germany	1835	341	3,637	6,979	11,729	20,693	24,845	31,386	35,558
Belgium	1835	207	554	1,074	1,799	2,399	2,776	2,833	2,871
Austria (proper)	1837	.....	817	1,813	3,790	7,083	9,345	11,921	13,427
Russia in Europe	1838	.....	310	988	7,098	14,026	17,534	26,889	31,545
Italy	1839	13	265	1,117	3,825	5,340	7,830	9,770	10,312
Holland	1839	10	110	208	874	1,143	1,632	1,966	2,225
Switzerland	1844	.....	15	653	885	1,596	1,869	2,342	2,740
Hungary	1846	.....	137	1,004	2,157	4,421	6,751	10,619	11,769
Denmark	1847	.....	20	69	470	975	1,217	1,764	2,141
Spain	1848	.....	17	1,190	3,400	4,550	5,951	8,252	8,432
Chili	1851	.....	.....	120	452	1,100	1,801	2,791	2,939
Brazil	1851	.....	.....	134	504	2,174	5,546	9,195	10,713
Norway	1854	.....	.....	42	692	970	970	1,231	1,608
Sweden	1856	.....	.....	375	1,089	3,654	4,899	6,663	8,321
Argentine Republic	1857	.....	.....	.....	637	1,536	4,506	10,013	13,690
Turkey in Europe . . . . .	.....	.....	.....	41	392	727	1,024	1,900	1,967
Peru . . . . .	.....	.....	.....	47	247	1,179	993	1,035	1,332
Portugal . . . . .	.....	.....	.....	42	444	710	1,188	1,475	1,689
Greece	1869	.....	.....	.....	6	7	416	604	771
Uruguay	1869	.....	.....	.....	61	268	399	997	1,210
Mexico	1868	.....	.....	.....	215	655	5,012	8,503	13,612
Roumania . . . . .	.....	.....	.....	.....	152	859	1,537	1,920	19,942
Australia* . . . . .	.....	.....	.....	.....	.....	789	4,850	11,111	16,502
Japan	1874	.....	.....	.....	.....	75	542	3,632	5,755
British India	1853	.....	.....	838	4,771	9,162	15,887	23,523	30,576
China	1883	.....	.....	.....	.....	.....	124	401	4,162
Africa . . . . .	.....	.....	.....	.....	.....	583	2,873	5,353	18,516

*Including New Zealand.

†Or latest figures.

RECOMMENDATIONS

In conclusion I would reiterate the following recommendations:

RAILWAY STATISTICS.

That the Bureau of Railway Statistics and Accounts, now a division of the Interstate Commerce Commission, be transferred to the Department of Commerce and Labor.

That its statistics be confined to the affairs of operating railway companies, the only carrier companies engaged in Interstate Commerce.

That its inquiries be confined to the data necessary to furnish the public with a comprehensive knowledge of railway conditions and operations in the United States from year to year.

That these statistics be devoted to publicity and not to the promotion of personal or official theories.

ACCIDENTS.

That Congress provide for an official investigation of all railway accidents in the United States along the lines so successfully adopted in the United Kingdom, and not in a spirit of hostility to the railways, as proposed in pending legislation.

This investigation should be through a Bureau of the Department of Commerce and Labor, composed as follows:

One Chief Inspector,

Ten District Inspectors, one for each Interstate Commerce group, appointed from Engineer service of the United States Army, with the rank of Major. This would insure fitness and impartiality for the work and valuable experience in regard to railway operations to the Army Engineers.

Three Deputy Inspectors for each group.

Three Assistant Inspectors for each group.

Several groups might require four inspectors of each class, and as many could get along with two..

Enough money could be deducted from the Interstate Commerce Commission appropriation to pay these officials liberally, so as to secure competent service, without crippling the legitimate work of the Commission.

Respectfully submitted,
SLASON THOMPSON.

APPENDIX A

THE NEW RAILWAY BILL.

As summarized by Representative Townsend in concluding the debate on the subject (April 22d), the railway bill before the House of Representatives provides:

"For a Court of Commerce.

"For relieving the Commission of the duty of defending and prosecuting its own orders.

"For vesting the responsibility of defending and prosecuting the interests of the United States in the Department of Justice, instead of permitting the responsibility for such legal work to be divided, as at present, between the Department of Justice and the Commission.

"It defines the duties of carriers as to providing reasonable and just classifications and regulations of all kinds.

"It vests the Commission with authority to promulgate, after hearing, either upon complaint or on investigation of its own initiative, the justness and reasonableness of rates and regulations of all kinds, including classifications, excess baggage, bills of lading, and exchange of cars by carriers.

"It amends the 'long-and-short-haul' clause by striking out the words 'under substantially similar circumstances and conditions.'

"It relieves from the operation of the Sherman anti-trust law agreements by carriers as to classifications, rates, fares and charges.

"It compels carriers to quote in writing, on written request, the correct rate for a specified shipment between places under schedules or tariffs to which such carriers are parties.

"It imposes greater prohibitions and penalties upon carriers and shippers against rebates and discriminations covering frauds in claims.

"It permits the Commission, either upon complaint or on its own motion, to determine the justness and reasonableness of agreements, classifications, rates, charges, and regulations, before they go into effect.

"It permits the shipper in cases where there are two or more lines connecting with the initial carrier, under such reasonable regulations as the Commission may prescribe, to route his freight

"It vests in the Commission the power to require annual reports from the carriers in December instead of in June, and also to require special and periodical reports.

"It protects existing competition by prohibiting the acquisition by one carrier of the road or stock of a competing carrier.

"It prevents overstock issues and excessive bonding, and, therefore, stock watering by carriers."



How the Gross Earnings of American Railways



Were Distributed in 1909

(See Page 73)

